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ABSTRACT

In order to determine the relationship of the socioeconomic variable sets of education, general characteristics, and income and housing to geographic variations in the collection size of academic and public libraries in the United States, data for the 50 largest Standard Metropolitan Statistical Areas (SMSAs) are analyzed using frequency distribution, correlation analysis, and regression analysis. Two hypotheses are tested: (1) the socioeconomic character of the SMSAs will relate to the collection size of both academic and public libraries, and (2) academic library collection size reveals greater correspondence with these socioeconomic characteristics than public library collection size. Analysis of data lends support to the first hypothesis but refutes the second, suggesting that the public library model is more strongly influenced by population. Supporting material is presented in 18 tables and 10 figures, and a bibliography is provided. An alphabetical listing and a listing ranked by population for the 50 largest SMSAs in 1973, frequency distributions, and regression tables are appended. (KM)

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GEOGRAPHICAL DISTRIBUTION OF ACADEMIC AND PUBLIC LIBRARY COLLECTIONS IN THE UNITED STATES: SOME SOCIO-ECONOMIC INTERPRETATIONS

ED277398

by

Wm. Dale Ebersole, Jr.

A thesis
presented to The University of Toledo
in partial fulfillment of the
requirements for the degree of
Master of Arts in Geography
in
The Department of Geography and Planning

_____
Advisor

_____
Dean of the Graduate School

Toledo, Ohio, 1984

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Chapter I

PUBLIC AND ACADEMIC LIBRARY COLLECTIONS IN THE UNITED STATES

INTRODUCTION

This study is centered on one of the most important social and educational institutions in the United States, the library. A survey of available data resources suggests that a geographic relationship may exist between the size of library collections and certain population characteristics. In addition, these data suggest the possibility of exploring comparisons between several different kinds of libraries. However, some data problems exclude certain school and special libraries from this study. As a result, the focus is the evaluation of certain socio-economic characteristics and their relationship to geographic variations in the collection size of both academic and public libraries.

The Standard Metropolitan Statistical Area (SMSA) was chosen as the areal unit of study because data are readily available giving the socio-economic characteristics for such places. Central cities were not considered because of the overlap of many library service areas into the surrounding metropolitan region. Also, very few urban places straddle

the county boundary lines which are the boundaries for all SMSAs except those in New England. A nearby example of a city which straddles county boundaries is Fostoria, Ohio. It is situated in three counties: Hancock, Seneca, and Wood. Wood County is the only one that is part of the Toledo Ohio-Michigan SMSA. In the New England area towns are used as boundaries for some segments of SMSA's such as Boston and Providence.

HYPOTHESES

Two hypotheses are formulated to assist in the exploration of the relationship between libraries and some socio-economic characteristics of the urban areas in which they are located.

1. "The *socio-economic character* of the *population* in the selected *SMSAs* will *relate* to the *collection size* of both *academic libraries* and *public libraries*."

2. "*Academic library collection size* reveals *greater correspondence* with these *population* characteristics than *public library collection size*."

OPERATIONAL DEFINITIONS

Socio-economic character - Several variables selected from the table entitled "Standard Metropolitan Statistical Areas with 200,000 population or more in 1970," found on pages 886-939, of the *Statistical Abstract of the United States, 1975*. They are described in detail in the section "Selected Socio-economic Statistics" beginning on page 4.

Population - The number of people living within the stated SMSA as listed in the *Statistical Abstract of the United States, 1975*, pages 886, 904, and 922 for July 1, 1973 (estimate).

SMSA - This study uses the fifty largest SMSAs, as defined by the Office of Management and Budget, Executive Office of the President, through April 1 6th, 1973, according to population size.

Relate - To establish the possibility of a relationship, association, or connection between population characteristics and library collection size.

Collection size - These data give the number of volumes for all books, bound periodicals, and government documents as reported in the *American Library Directory (1974)*.

Academic Libraries - They include all post high school libraries supporting educational institutions. Medical and law libraries are excluded.

Public libraries - They include all libraries that provide general library services, without fee, to all residents of a given community or geographic area. Military libraries that serve such population groups are also included. Hospital patient libraries are excluded.

Greater correspondence - Reveals correlations or relationships between the major variables.

DESCRIPTION OF MAJOR DATA SETS

Academic and Public Library Collection Statistics

These data were obtained from the *American Library Directory* (1974). Entries in this directory are listed by state and then location. Since these entries contain the telephone area codes it is possible to eliminate some duplicate locations from the state listings to be examined by using the area code. Each location was then checked in the *Rand-McNally Commercial Atlas and Marketing Guide* to determine the county in which it is located. This name was then compared with the list of counties for the SMSA involved. The source for the list of counties or townships included is the *Statistical Abstract of the United States: 1975*, pages 940 to 943, or the appropriate *Census Tract*. If the same location appears in two or more counties, zip codes are used to determine the proper county location. The resulting data were placed in separate columns for academic and public libraries and totaled (on work sheets).

Selected Socio-economic Characteristics

As mentioned in the section on operational definitions, those socio-economic characteristics chosen were nearly all obtained or derived from data in the *Statistical Abstract of the United States, 1975*. Each data set in the designated table was evaluated for inclusion in this list. Those selected, along with some reasons for inclusion, follow:

1. Teacher-pupil ratio in public schools, Oct., 1972 (variable 9). (Variable 9 is the label used in this study for identification purposes. This and all following variable labels may be found in Table 1 in Chapter Two.) It is calculated by dividing the number of pupils by the number of teachers, from the tables found on pages 889, 907, and 925 of the *Statistical Abstract of the United States, 1975*. Areas with lower ratios may exhibit a greater demand for educational opportunities. One possible result is larger collections for both academic and public libraries.
2. Educational attainment. Adults who have completed four years of high school or more, 1970 (variable 10). The better educated the population of an area may be, the greater the demand for libraries and the better their libraries may be supported. As a consequence there could be more and larger library collections.
3. SMSA population, total July 1, 1973 (variable 14). This is, perhaps, the most useful of all

the characteristics, as well as being the basic one. In general, one would expect to find larger numbers of volumes and and a greater number of both public and academic libraries in the larger SMSAs.

4. Physicians per 100,000 population (variable 15). An association between the number of physicians and economic status of the population is assumed. A higher ratio may suggest a population composition that can support larger libraries and library collections.
5. Crime rate per 100,000 population, 1973 (variable 16). Higher crime rates may reflect areas with greater numbers of people with lower incomes. They are often infrequent users of both academic and public library collections. As a result, areas with higher crime rates may have smaller library collections.
6. Vote cast for President, 1972, percent majority party (variable 17). An association between party affiliation and relative income is assumed. Republican strength may be related to greater support for library collections.
7. Social security recipients, Dec., 1974 (variable 18). The larger the number of people on social security the smaller the collection size may be. Limited incomes may result in less spending and a lower economic base of the area. Public libraries tend to have smaller collections due to the negative economic impact of

large numbers of people with lower incomes. However, this effect may be cancelled by greater demands from the retired for services due to their increased leisure time. Academic libraries may be fewer in SMSA's with larger concentrations of older people.

8. Social security recipients per 100,000 (variable 19). Social security recipients, Dec., 1974, is divided by SMSA population, to obtain this standardized rate. The larger the concentration of people receiving income from social security, the smaller the collection size may be. Limited incomes may result in less spending and a lower economic base of the area. Public libraries may have smaller collections due to the negative economic impact of large numbers of people with lower incomes. Nevertheless, this effect also may be cancelled by greater demands from the retired for services due to their increased leisure time. As mentioned previously, academic libraries may be fewer in SMSA's with larger concentrations of older people.
9. Land area in square miles, 1972 (variable 20). This variable is included to evaluate the effect of physical size of the SMSA on the size of collections and the number of libraries. In a comparison of two SMSA's population, the one with the greater distances of travel may have the smaller collection and the fewer number of libraries.

10. Income per square mile in 1972 (variable 21). In general, the higher the income the wealthier the area may be. Assuming that the wealthier SMSAs provide relatively greater financial support, they may have larger academic and public library collections.
11. Per capita income, 1973 (variable 22). Higher income areas may have larger collections resulting from greater financial support to both types of libraries.
12. Retail trade, per capita sales, all establishments, 1972 (variable 23). The higher the sales, the wealthier the area may be. Therefore, larger collections for both academic and public libraries may be expected.
13. Local government, per capita total direct general expenditure (variable 24). Since the public library is a component of local government, the greater the amount of money spent per person the greater the support for public libraries may be. As a result, they may have larger collections. For academic library collections, this characteristic may serve only as an indicator of the relative wealth and support given to the community by its populace.
14. Housing units (year-round), percent owner occupied in 1970 (variable 25). High percentages may suggest an economically deprived population. High percentages also may suggest a SMSA with a less mobile population. The more stable the population of an SMSA seems to be,

the greater the support for and use of libraries should be.

15. Housing units with 1.01 or more persons per room in 1970. (variable 26). As defined by the U.S. Bureau of the Census. Census of Population and Housing: 1970 (1972). A high percentage of such units suggests that more housing units in that SMSA have larger numbers of persons residing in them. Normally, this is indicative of a population that has limited financial resources. A possible result is less financial support for libraries. Therefore, library collection size may be lower.

In addition, several education variables were selected from Table P-2 Social Characteristics of the Population, under "Years of school completed" of the appropriate *Census Tract* (U.S. Bureau of the Census. Census of Population and Housing: 1970, 1972).

16. Adults, median school years completed, 1970 (variable 11). The more highly educated the population of an area may be, the better their libraries may be supported. As a result there could be more and larger library collections.

17. Percent 16 to 21 years not high school graduates and not enrolled in school, 1970 (variable 12). The fewer the high school dropouts the better educated the population of an area may be, with the possibility of better support for their libraries. As a result there could be more and larger library collections.

18. Adults who have completed four years or more of college, 1970 (variable 13). The better educated the population of an area may be, the better their libraries may be supported. As a result there could be more and larger library collections.

Data from the 1970 Census of Population were utilized since at the time the statistics for this study were collected no later socio-economic data were available.

GENERAL DISCUSSION

The concept for this study developed from conversations with several acadamicians concerning libraries and society's influence on their locations. An investigation of this relationship required concentration at the national level. In this research, evaluation is made of aggregate data at the national and regional levels.

Analysis of data sources confirmed that the sensitivity of this investigation may be related to larger areas rather than smaller. States, or even a combination of states, were assumed to be too large an area given the numbers of libraries available. The SMSA was chosen as the unit of study because statistics on the socio-economic character of the population are readily available for that spatial unit. The choice of academic and public library collections is based on the availability of data within similar units.

The probability of similar relationships existing for characteristics for both types of libraries is evaluated.

In Chapter Four data are displayed on maps so that regional geographic patterns may be readily observed and evaluated.

DATA SOURCES

This section repeats and amplifies the information given above in the segment entitled: "Academic and Public Library Collection Statistics." The actual sources used to obtain the data for the library variables are the following: *The American Library Directory*, 29th ed. 1974-1975; *Statistical Abstract of the United States*, 1975 and other editions; and the *Rand-McNally Commercial Atlas*, 1974. For each of the fifty SMSAs the list of component counties is obtained from the *Statistical Abstract*. In addition, the Boston and Providence SMSAs required the use of census tract maps to locate the townships involved. The *Directory's* list of cities for the state(s) is checked against each county listing in the *Atlas* for that location. The prominent placement of the telephone area codes made it possible to eliminate further examination of the entries under a particular location when the area code differed. Each library listing under a location is then checked for type of library using the codes provided in the *Directory*. If the library listed is public or academic,

the holdings data are recorded along with the number of public library main buildings and branches which serve the public directly. For academic libraries, only the number of institutions is recorded.

If a city is located in two or more counties (not all within the SMSA) the actual location of the library is determined from an examination of the USGS topographic map sheet(s) containing that city, when the *Rand-McNally Commercial Atlas* map is not definitive. In instances where multiple entries of the same place name are found in the *Atlas*, zip codes are used to determine if the entry needed to be checked for its county location. Identical zip codes are found in situations where a community and its surrounding political subdivision, usually a township, carry the same name. This occurs in New Jersey, for example.

LITERATURE REVIEW

Several literature searches were conducted using the following key words, terms, or phrases: **libraries, social area(s), socioeconomic characteristics, public library(ies) collection(s),** and **academic library(ies) collection(s).** In using the *Social Science Citation Index*, *Library Literature*, and other sources, no articles directly relating to the method of analysis of library holdings were found. A computer search of the ERIC data base turned up no additional refer-

ences. In addition, a search of the subject card catalog using the headings **collections** and **collection development** was fruitless. However, by using the Library of Congress class numbers to browse through the shelves of related material, one monograph that utilized similar techniques was discovered. A thorough check of all authors and references in that monograph revealed only source material of limited value.

The monograph mentioned above is *Urban Analysis for Branch Library System Planning* by Robert E. Coughlin, Francoise Taieb, and Benjamin H. Stevens (1972). The authors present a table of correlations of library statistics for all public "library systems serving more than 100,000 persons in the states which comprise the **megalopolis** and the **manufacturing belt**" (Coughlin et al., 1972, p. 22). On the following page they present their correlation table. **Volumes in collection** is one of the variables used. Their comments, stressing the limitations and care one must use in assuming causality within the significant statistical relationships are very important in interpreting the results.

Other items of significance were found using **collection development** and **circulation** as search terms. The article by Parker and Paisley (1965) gives some valuable insight into the statistical methods employed in this study. Even though based on library circulation statistics in over 2,700 commu-

nities, the authors investigated the relative influence of ten socio-economic variables from the 1960 Census upon library circulation in the United States. This study evaluated the variables using first the means and standard deviation, then the variable correlations pattern, and finally regression analysis. The last technique was used in an attempt to explain or predict the variance in the dependent library circulation variables.

An article by McGrath, Huntsinger, and Barber (1969) provides additional insight into the evaluation of a large correlation matrix. Also, Reichard and Orsagh (1966) provide some additional information into the utilization of regression analysis as a research tool in analyzing data concerning academic libraries.

The doctoral dissertation of Frederick Allen Schlipf (1973) entitled *Geographic Distribution of Urban Public Library Use and Its Relationship to the Location of Branch Libraries* provides useful information on the presentation of the results from regression analysis.

Additional monographs discussing the various statistical techniques used were located under the subject heading **Geography--Statistics** in the card catalog. Cole and King's (1968) *Quantitative Geography* was the most useful source for gaining an understanding of the statistical processes being employed.

Other helpful sources include Hammer and Leadley's (1976) "A Comparative Study of Socioeconomic Characteristics Associated with Leisure Attitudes" which suggests the use of variables such as education, income, and age. In reviewing their findings, Hammer and Leadley point out that the same variable may not influence leisure in another country or possibly even a different state or geographic area. This suggests that the factors influencing collection size in the United States may not have the same importance or relevance if applied to another nation. Also, regional variations of the factors influencing collection size within the United States will probably occur.

METHOD OF ANALYSIS

The data collected and processed for this study are analyzed in five spatial sets - the United States as a whole, and in four regions, Northeast, Northwest, Southeast, and Southwest. The methodologies employed are means, Pearson correlations, and multiple regression analysis. The resulting statistics are presented in appropriate tables or matrices and evaluated.

Maps were constructed showing the locations of the SMSAs in the United States and the four regions into which the United States was divided. Data from the regression analysis also were entered on outline maps, and the resulting spatial patterns examined.

GENERAL FORMAT OF STUDY

First, the frequency distribution of the data for the United States and the four regions is presented in tabular form and briefly analyzed. The twenty-six variables are divided into two major sets, *library* (academic and public groups) and *socio-economic* (education, general characteristics, and income and housing groups), for the discussion.

Second, the Pearson correlations are analized. The two major sets of variables, library and socio-economic, are evaluated separately, the latter being divided into three groups (education, general characteristics, and income and housing). Reference to the matrices of the resultant significant correlation coefficients are made. Note is made of regional differences throughout the evaluation.

Third, stepwise regression analysis is used to evaluate the strength and functional character of the contributions made to the explanation of each individual library variable by the socio-economic variables included in this study. Geographic presentations provide important assistance in the interpretation of this data. Some observed regional variations are noted.

Finally, some suggestions for future study are made.

Chapter II

REGIONAL EXAMINATION OF LIBRARY COLLECTIONS AND SOCIO-ECONOMIC DATA

In this chapter the fifty Standard Metropolitan Statistical Areas are divided into four regions for purposes of comparative analysis. It is assumed that the historical development of libraries differs from place to place and that regional distinctions will occur. Cartographic analysis of library data in Chapter Four as well as the socio-economic data present additional insight into these regional findings. Initially, all data are reduced to a series of measures of central tendency from which the means are selected for discussion.

REGIONS

The regional delimitations are subjective. The rationale for this arrangement is composed of several parts. First, all states are kept intact. For example, California is not divided into two sections. This would place the SMSAs in the northern half of the state in the Northwest region. It was arbitrarily decided to use the following boundaries between the four regions, the Mississippi River between east and west; and the Mason-Dixon Line and Ohio River then

extending from the southern boundary of Missouri and the 38th parallel west, then around the southern border of Nevada, and finally, north along the California boundary to the West Coast, as the distinction between the north and south (Figure 1). Upon observation of the map of SMSAs (Figure 2 and Appendix A) their unequal distribution over the United States should be noted. This made it impossible to have the same number of data points, or SMSAs, in each region.

Hereafter, *region* refers to the United States (all fifty SMSAs) and the four regions; Northeast, Northwest, Southeast, and Southwest, as delineated in Figure 1.

GENERAL DISCUSSION: AGGREGATION OF DATA

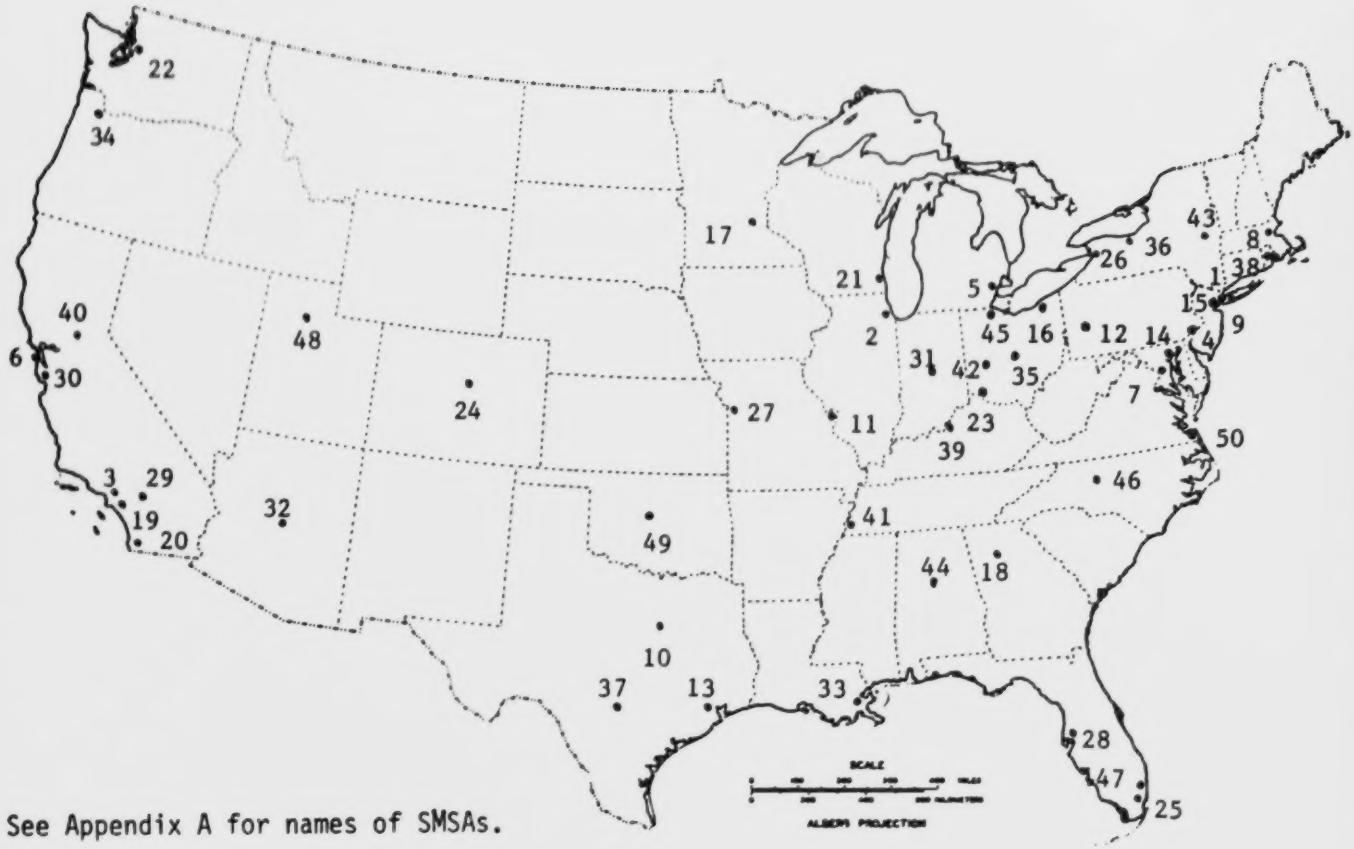
Frequency distributions of all data sets were prepared for examination. The means for the United States and for each of the four regions prove to be the most significant data set for this preliminary analysis. These statistics are selected for discussion (see Table 1) and for an initial test of the hypotheses. Standard deviations and medians also are obtained. These data are presented in Appendix B.

The following discussion is arranged along two major sets of variables, libraries and socio-economic characteristics. The number of cases, SMSAs, within each region may affect the statistical reliability of these findings. Table 1 contains the two major sets of statistics, library variables

REGIONAL BOUNDARY MAP

Figure 1

SMSA LOCATION MAP



See Appendix A for names of SMSAs.

Figure 2

TABLE 1

Frequency Distribution (Means)-Five Geographic Areas

no.	VARIABLE NAME	US n=50	NE n=19	NW n=7	SE n=11	SW n=13
01	Academic Library Volumes.					
	Mean	3,422,000	4,567,000	2,293,000	1,984,000	3,572,000
	Variation from US mean		+33%	-33%	-42%	+4%
02	Academic Library Vols. per 1,000.					
	Mean	1,889.8	2,220.4	1,888.8	1,356.8	1,858.3
	Variation from US mean		+17%	0%	-28%	-2%
03	Academic Library Numbers.					
	Mean	18.3	23.5	14.1	13.9	16.5
	Variation from US mean		+28%	-23%	-24%	-10%
04	Academic Libraries per 1,000,000.					
	Mean	10.4	11.3	11.0	10.6	8.7
	Variation from US mean		+9%	+6%	+2%	-16%
05	Public Library Volumes.					
	Mean	3,861,000	5,614,000	2,431,000	1,938,000	3,694,000
	Variation from US mean		+45%	-37%	-50%	-4%
06	Public Library Vols. per 1,000.					
	Mean	2,172.0	2,933.3	1,880.0	1,334.3	1,925.4
	Variation from US mean		+35%	-13%	-39%	-11%
07	Public Library Numbers.					
	Mean	77.5	108.9	51.6	42.5	75.2
	Variation from US mean		+41%	-33%	-45%	-3%
08	Public Libraries per 1,000,000.					
	Mean	44.6	57.8	39.6	32.8	37.9
	Variation from US mean		+30%	-11%	-26%	-15%
09	Teacher per Pupil Ratio.					
	Mean	18.3	17.4	18.8	18.6	19.0
	Variation from US mean		-4.9%	+2.7%	+1.6%	+3.8%

VARIABLE no.	NAME	US n=50	NE n=19	NW n=7	SE n=11	SW n=13
10-	High School Graduates.					
	Mean	55.4%	54.3%	61.9%	47.8%	59.9%
	Variation from US mean		-2%	+12%	-14%	+8%
11-	Median School Years Completed.					
	Mean	12.11	12.11	12.31	11.83	12.23
	Variation from US mean		0%	+1.7%	-2.3%	+1.0%
12-	Dropouts, Age 16-21.					
	Mean	13.9%	12.8%	11.8%	17.1%	14.1%
	Variation from US mean		-8%	-15%	+23%	+1%
13-	College Graduates.					
	Mean	12.4%	11.6%	13.7%	11.4%	13.6%
	Variation from US mean		-6%	+10%	-8%	+10%
14-	SMSA Population.					
	Mean	1,943,000	2,506,000	1,288,000	1,303,000	2,012,000
	Variation from US mean		+29%	-34%	-33%	+4%
15-	Physicians per 100,000.					
	Mean	199.4	197.9	201.6	194.8	204.2
	Variation from US mean		-0.8%	+1.1%	-2.3%	+2.4%
16-	Crime, Rate per 100,000.					
	Mean	5,920.8	4,848.2	6.575.3	6.407.3	6,641.9
	Variation from US mean		-18%	+11%	+8%	+12%
17-	Republican Vote for President, 1972.					
	Mean	60.1%	57.3%	60.8%	65.4%	59.2%
	Variation from US mean		-5%	+1%	+9%	-1%
18-	Social Security Recipients.					
	Mean	258,100	346,600	164,000	176,600	248,300
	Variation from US mean		+34%	-36%	-32%	-4%
19-	Social Security Recipients per 1,000.					
	Mean	141.4	156.4	124.6	146.8	123.8
	Variation from US mean		+11%	-12%	+4%	-12%

no.	VARIABLE NAME	US n=50	NE n=19	NW n=7	SE n=11	SW n=13
20-	Land Area in Square Miles.					
	Mean	3,566.5	2,215.5	4,694.1	2,391.2	5,928.4
	Variation from US mean		-38%	+32%	-33%	+66%
21-	Income per Square Mile.					
	Mean	3,746.5	6,007.8	1,234.9	2,448.7	2,892.1
	Variation from US mean		+60%	-67%	-35%	-23%
22-	Per Capita Income.					
	Mean	5,336.6	5,574.5	5,178.4	5,169.9	5,215.2
	Variation from US mean		+4.5%	-3.0%	-3.1%	-2.3%
23-	per Capita Retail Sales.					
	Mean	2,355.4	2,251.3	2,410.3	2,469.3	2,318.6
	Variation from US mean		-4.4%	+2.3%	+4.8%	-1.6%
24-	Local Gov. Expenditures.					
	Mean	560.8	599.0	479.1	503.4	597.7
	Variation from US mean		+7%	-15%	-10%	+7%
25-	Owned Housing Units.					
	Mean	62.0%	62.2%	65.5%	61.8%	59.9%
	Variation from US mean		+0.3%	+5.6%	-0.3%	-3.4%
26-	Owner Occup., Over 1.01 Persons/Room.					
	Mean	7.5%	6.5%	6.7%	8.4%	8.8%
	Variation from US mean		-13%	-11%	+12%	+17%

(nos. 1-8) and socio-economic variables (nos. 9-26). The first column presents findings for the country (50 SMSAs) followed by the four regions, Northeast (19), Northwest (7), Southeast (11), and Southwest (13). The aggregate results for the United States in the first column presents the initial base for a comparative regional analysis. To assist

further this comparative analysis, regional differences from the United States' total are converted to percentages and are part of Table 1. The library set, variables (nos. 1-8) and their regional patterns, are examined first (Table 2).

LIBRARY VARIABLES

Table 2 is presented to provide another method of interpreting the library statistics. The complete set of library

TABLE 2

Average Percentage Departure from US Mean

		REGION			
VARIABLES	GROUP	NE n=19	NW n=7	SE n=11	SW n=13
Nos. 1-8	Combined	+30%	-18%	-32%	-7%
Nos. 1-4	Acad. Lib.	+22%	-12.5%	-23%	-6%
Nos. 5-8	Public Lib.	+38%	-23.5%	-40%	-8%

variables is divided into its two major components, academic library and public library statistics, to observe their patterns and check for regional variations. The statistics in Table 2 are obtained by summing the percentage departure from the United States' mean by region for the appropriate sets of variables (numbers 1-8, 1-4, and 5-8). These are then divided by the number of variables involved (either four or eight) to derive the mean.

In observing Tables 1 and 2, the first pattern noted is the regional relationship to the United States' mean. The strong positive results in the Northeast region are counterbalanced by the negative averages for the other three regions. Both the Northwest and the Southeast record much stronger negative figures than the Southwest. For all the library variables (nos. 1-8, Table 1) the highest actual values for the means are in the Northeast region, and the values of the means for the other three regions are below that of the United States. The negative values in the rows labeled Variation from the United States' mean in Table 1 note this situation, and are confirmed by the averages given in Table 2 for the other two groups of library variables. This is the basic pattern that will be discussed in the remainder of this chapter.

Using Table 2 for comparison of library groups, the academic library statistics have less departure from the United States' mean than do the public libraries. On a region by region comparison of the three groups, the Southwest reveals similar deviations (-7%, -6%, -8%) from the United States data while the remaining regions show greater internal variation in addition to their larger departures from the mean.

For the Northeast's higher values, some possible reasons are that the oldest public libraries and academic institutions are located here. They are well supported by both

private contributions and public taxes. This continuous, generous support over many more years has resulted in the largest collections for any region.

Contributing to the low values for the Southeast region may be a number of factors including an average population of just over half that of the Northeast. Age of library facilities is not a factor, since the area was settled at about the same time as the Northeast. A rural agricultural economy contributed to a much slower growth in the population of the region's few urban areas. It was the exception to educate the slave portion of the population and the wealthy usually maintained private or family libraries. Physical losses to buildings and collections along with the loss of economic support during and after the Civil War also was significant. Later, the lower tax support and the maintenance of the "separate but equal" school systems further diluted the limited funding for individual academic institutions. While the cultural values of the 1800's limited the amount of education given to females in all regions, the Southeast was the latest to provide women much opportunity for higher education. Also, the late development of an industrial base probably delayed the expansion of womens' vocational choices when compared with the other three regions, and thus their contribution to the region's economy.

After the Second World War, the availability of air conditioning and a lower wage structure have played major roles in the movement of individuals and industry to the so-called Sunbelt. This factor has probably resulted in strong pressures on libraries in the Southeast.

Academic Libraries (Table 3)

For the group of four academic library variables the average regional relationship with the United States' mean is the following (see Table 2): Northeast, +22 percent; Northwest, -12.5 percent; Southeast, -23 percent; and Southwest, -6 percent. Then these statistics are compared with all the academic library variables in Table 3 to further aid their interpretation.

When variable 1, Academic Library Volumes, is standardized by population as in variable 2, Academic Library Volumes per Thousand Population, the differences as expressed by percentage variation from the US mean, decrease markedly except for the Southwest region. A similar situation is exhibited by variable 4, Academic Libraries per 1,000,000 Population, in comparison to variable 3, Academic Library Numbers. In both instances the decrease in variation from the United States' mean occurs for three of the four regions (Northeast, Northwest, Southeast). However, standardizing by population increases this difference in the

TABLE 3

Academic Libraries

VARIABLE no.	NAME	US n=50	*REGION* NE n=19	NW n=7	SE n=11	SW n=13
01-Academic Library Volumes.						
	Mean	3,422,000	4,567,000	2,293,000	1,984,000	3,572,000
	Variation from US mean		+33%	-33%	-42%	+4%
02-Academic Library Vols. per 1,000.						
	Mean	1,889.8	2,220.4	1,888.8	1,356.8	1,858.3
	Variation from US mean		+17%	0%	-28%	-2%
03-Academic Library Numbers.						
	Mean	18.3	23.5	14.1	13.9	16.5
	Variation from US mean		+28%	-23%	-24%	-10%
04-Academic Libs. per 1,000,000.						
	Mean	10.4	11.3	11.0	10.6	8.7
	Variation from US mean		+9%	+6%	+2%	-16%

Southwest for variable 4, the only significant change in Table 3. These figures suggest that both Academic Library Volumes and Academic Library Numbers are functionally related to population size, which can be expected. The considerable negative difference exhibited for the Southwest (-16%) and for the Southeast (-28%) may be attributed to the rapidly increasing population of these regions and, perhaps, to less public support for academic institutions during the preceding decades.

Public Libraries (Table 4)

The means of all four public library variables, numbers 5-8, follow the pattern where the Northeast is much above

TABLE 4

Public Libraries

no.	VARIABLE NAME	US n=50	REGION NE n=19	NW n=7	SE n=11	SW n=13
05	Public Library Volumes.					
	Mean	3,861,000	5,614,000	2,431,000	1,938,000	3,694,000
	Variation from US mean		+45%	-37%	-50%	-4%
06	Public Library Vols. per 1,000.					
	Mean	2,172.0	2,933.3	1,880.0	1,334.3	1,925.4
	Variation from US mean		+35%	-13%	-39%	-11%
07	Public Library Numbers.					
	Mean	77.5	108.9	51.6	42.5	75.2
	Variation from US mean		+41%	-33%	-45%	-3%
08	Public Libraries per 1,000,000.					
	Mean	44.6	57.8	39.6	32.8	37.9
	Variation from US mean		+30%	-11%	-26%	-15%

the United States' mean, and the other three regions are below. While the Southwest's values are relatively close to the United States' mean, the other two regions, Northwest and Southeast, are much below.

For variable 5, Public Library Volumes, these statistics tend to exaggerate regional differences. When standardized by population as in variable 6, Public Library Volumes per

Thousand Population, the differences as expressed by percentage variation decrease except for the Southwest region. A similar situation is exhibited by variable 8, Public Libraries per 1,000,000 Population, when compared to variable 7, Numbers of Public Libraries. When variable 7 is standardized to libraries per million as exhibited in variable 8, the large regional variations become smaller as with variables 5 and 6, except for the Southwest.

Again, a possible functional relationship between volumes, libraries, and population must be noted. The Northeast continues to be the leading area with respect to public and scholarly access to publications. Even standardizing does not diminish the positive results substantially. On the other hand, the three regions with negative means continue to reflect lagging growth rates in library resources relative to population growth.

SOCIO-ECONOMIC VARIABLE SET

A discussion of the socio-economic variables (Table 1, numbers 9-26) is necessary since they are an integral part of the hypotheses used in the formulation of this study. The first hypothesis notes the relationship of the socio-economic characteristics of the population in the selected SMSAs to the collection size of both academic and

public libraries. The second hypothesis examines the correspondence between these socio-economic variables and academic and public library collection size.

As in the preceding sections, the following analysis of these variables is basically descriptive with the emphasis on regional distinctions. Some general patterns can be noted and brought to the attention of the reader for the purpose of additional analysis in subsequent sections. Only the most obvious of patterns within these tables are described since the diversity of variables makes their grouping and classification difficult.

To facilitate this examination, the socio-economic variables have been organized into three groups. The first is Education, variables 9-13 (Table 5). The second group is General characteristics, variables 14-20 (Table 6). Income and housing, variables 21-26, is the third (Table 7).

Education (Table 5)

One general observation to be made is that the educational systems for the SMSAs used in this study produce relatively similar results. However, it should be noted that the fifty SMSAs in this study represent a largely urban population with cities which contain relatively well developed school systems.

TABLE 5

Education Variables

VARIABLE no.	NAME	US n=50	REGION NE n=19	NW n=7	SE n=11	SW n=13
09-Teacher per Pupil Ratio.						
	Mean	18.3	17.4	18.8	18.6	19.0
	Variation from US mean.		-4.9%	+2.7%	+1.6%	+3.8%
10-High School Graduates.						
	Mean	55.4%	54.3%	61.9%	47.8%	59.9%
	Variation from US mean		-2%	+12%	-14%	+8%
11-Median School Years Completed.						
	Mean	12.11	12.11	12.31	11.83	12.23
	Variation from US mean		0%	+1.7%	-2.3%	+1.0%
12-Dropouts, Age 16-21.						
	Mean	13.9%	12.8%	11.8%	17.1%	14.1%
	Variation from US mean		-8%	-15%	+23%	+1%
13-College Graduates.						
	Mean	12.4%	11.6%	13.7%	11.4%	13.6%
	Variation from US mean		-6%	+10%	-8%	+10%

Several of the variables in Table 5 exhibit little variation from the United States' mean. They include variables 9 and 11, Teacher per Pupil Ratio and Median School Years Completed. The other three variables often show greater departures from the United States' mean, and these may be related to differences in regional educational systems.

For variable 10, High School Graduates, both the Northwest and Southeast regions reveal large variations from the United States' average. The Northwest school systems

graduate a larger percentage of students from high school than those in the Southeast region. Dropouts from school follow a similar pattern. While the Northwest records a higher than average success rate for high school graduates, it also records a significantly lower rate for dropouts. The pattern for the Southeast is the reverse: a smaller than average school completion rate but a very high dropout rate in comparison to the United States' mean. Educational achievement at the college level, variable 13, reveals that the Northwest and Southwest region exhibit higher than average figures while the Southeast is again significantly below the United States' mean.

It should be noted that the Teacher per Pupil Ratio, variable 9, functions in inverse order (the lower the number the more desirable the situation). In this instance fewer pupils per teacher theoretically enhances the educational environment. Variable 12, Dropouts Age 16 to 21, also functions in this inverse fashion.

General Characteristics (Table 6)

This is a diverse group of variables. So, comparisons are tenuous in most cases. The intent is to use this material as additional tests for the hypotheses.

Variable 18, Social Security recipients, exhibits the same pattern of regional relationships to the United States'

TABLE 6

General Characteristics

VARIABLE no.	NAME	US n=50	REGION NE n=19	NW n=7	SE n=11	SW n=13
14-SMSA Population.						
	Mean	1,943,000	2,506,000	1,288,000	1,303,000	2,012,000
	Variation from US mean		+29%	-34%	-33%	+4%
15-Physicians per 100,000.						
	Mean	199.4	197.9	201.6	194.8	204.2
	Variation from US mean		-0.8%	+1.1%	-2.3%	+2.4%
16-Crime, Rate per 100,000.						
	Mean	5,920.8	4,848.2	6.575.3	6.407.3	6,641.9
	Variation from US mean		-18%	+11%	+8%	+12%
17-Republican Vote for President, 1972.						
	Mean	60.1%	57.3%	60.8%	65.4%	59.2%
	Variation from US mean		-5%	+1%	+9%	-1%
18-Social Security Recipients.						
	Mean	258,100	346,600	164,000	176,600	248,300
	Variation from US mean		+34%	-36%	-32%	-4%
19-Social Security Recipients per 100,000.						
	Mean	141.4	156.4	124.6	146.8	123.8
	Variation from US mean		+11%	-12%	+4%	-12%
20-Land Area in Square Miles.						
	Mean	3,566.5	2,215.5	4,694.1	2,391.2	5,928.4
	Variation from US mean		-38%	+32%	-33%	+66%

mean as noted for library variables. The strong positive departure from the United States' mean for the Northeast region is counterbalanced by the negative departures in the other three regions. SMSA population, variable 14, exhibits a similar pattern except for the Southwest region which has a slight positive deviation instead of a negative one.

One should note that variable 18 is a subset of variable 14, since Social Security recipients are a segment of the population in an SMSA and may covary.

With variable 16, Crime Rate per 100,000, the Northeast's rate is significantly lower than that of the other three regions. Also, the wide-ranging variation in variable 20, Land Area in Square Miles, can be explained by the much larger size (area) of the counties in the two western regions when compared with those of the two eastern regions.

The similarity of regional patterns suggests that some form of relationship exists between variables 14 and 18, and the library variables, especially those that are not standardized.

Income and Housing (Table 7)

This group of variables also exhibits the diversity shown by the general characteristics group. Variable 21, Income per square mile, exhibits the pattern found earlier of the Northeast being much above the United States' mean with the other three regions being below. For variable 22, Per Capita Income, the regional variance pattern is the same, but there is little deviation from the United States' mean for any region.

TABLE 7

Income and Housing

VARIABLE no.	NAME	US n=50	REGION NE n=19	NW n=7	SE n=11	SW n=13
21-Income per Square Mile.						
	Mean	3,746.5	6,007.8	1,234.9	2,448.7	2,892.1
	Variation from US mean		+60%	-67%	-35%	-23%
22-Per Capita Income.						
	Mean	5,336.6	5,574.5	5,178.4	5,169.9	5,215.2
	Variation from US mean		+4.5%	-3.0%	-3.1%	-2.3%
23-Per Capita Retail Sales.						
	Mean	2,355.4	2,251.3	2,410.3	2,469.3	2,318.6
	Variation from US mean		-4.4%	+2.3%	+4.8%	-1.6%
24-Local Gov. Expenditures.						
	Mean	560.8	599.0	479.1	503.4	597.7
	Variation from US mean		+7%	-15%	-10%	+7%
25-Owned Housing Units.						
	Mean	62.0%	62.2%	65.5%	61.8%	59.9%
	Variation from US mean		+0.3%	+5.6%	-0.3%	-3.4%
26-Owner Occup., Over 1.01 Persons/Room.						
	Mean	7.5%	6.5%	6.7%	8.4%	8.8%
	Variation from US mean		-13%	-11%	+12%	+17%

In variable 24, Local Government Expenditures, a difference of at least 17 percent separates the Northeast and Southwest from the lower Northwest and Southeast regions. All the other variables in this group exhibit little regional deviation.

SUMMARY

In this chapter, the regional divisions were introduced for comparative analysis. The Means of the individual variables for the United States and the four regions (NE, NW, SE, SW) were presented in tabular form and briefly discussed. The twenty-six variable data sets were divided into two major sets, library and socio-economic, for purposes of discussion. Each set was subdivided into several groups - academic library, public library, education, general characteristics, and income and housing. For each variable in these groups the percentage variation from the United States' mean was calculated for each of the four regions and then presented in separate tables by group to aid in the discussion.

Chapter III

URBAN LIBRARIES AND SOCIO-ECONOMIC CHARACTERISTICS: CORRELATION PATTERNS

The major purpose of this chapter is to evaluate the relationship between libraries and the socio-economic characteristics of the population of the SMSAs in which they are located. It is assumed that both types of libraries studied here exhibit this influence. Public libraries are directly influenced by the population since they are directly dependent upon them for economic support. Academic libraries are also dependent upon the population for part of their support (gifts or taxes) in addition to the tuition paid by the institution's student body.

The first section examines the interrelationship between the two types of libraries, academic and public, in terms of both volumes and number of libraries. Because libraries are the major focus in this study, a preliminary examination of some characteristics is in order.

In the second section, the library variable relationships with socio-economic variables are evaluated. This section provides the major test of the second hypothesis. In both instances geographic area variations are discussed. A summary concludes this chapter.

INTRODUCTION TO LIBRARY AND SOCIO-ECONOMIC CORRELATIONS

The main purpose for using correlation analysis is to determine the type and degree (strength) of association or relationship between pairs of factors or variables. For this method of analysis Pearson's correlation is utilized.

The Pearson zero-order product-moment correlation coefficient is used to determine the linear relationship between pairs of variables. A perfect correlation's coefficient is 1.0. The absence of a correlation is indicated by a coefficient approaching 0.0. A negative, or inverse perfect correlation's coefficient is designated by a value of -1.0. The coefficients are calculated by pairing each of the twenty-six selected variables with each other. The output generated from the analysis consists of five, twenty-six by twenty-six matrices, one for the United States and one for each region. From each of these matrices, the information was reduced by presenting only those correlation coefficients significant at the .05 level for all fifty SMSAs (United States) and for each of the four regions. The resulting tables from the appropriate portions of these matrices are presented throughout the chapter.

A significant correlation is assumed to exist when the probability of the coefficient occurring by chance is less than 5%. Dashes in the tables represent items omitted because their significance levels are greater than .05.

Negative signs indicate the presence of an inverse relationship. This means that as the value of one variable increases, the value of the other decreases. A positive correlation coefficient indicates that the value of both variables increase or decrease in the same orientation.

The comparisons of the interrelationships between all library variables and library variables with socio-economic variables are included. However, the comparisons of the interrelationships between socio-economic variables are outside the scope of this research. As a result only five, eight by twenty-six matrices are required, not the twenty-six by twenty-six matrices originally produced.

EVALUATION OF THE CORRELATION PATTERN OF PAIRING ACADEMIC LIBRARY VARIABLES WITH PUBLIC LIBRARY VARIABLES

In this section the significant coefficients resulting from the pairing of the set of library variables (nos. 1-8) are evaluated. To aid the analysis, these coefficients are abstracted from the original matrices and presented in Table 8. The patterns for the five spatial sets, the United States and the four regions (Northeast, Northwest, Southeast, Southwest), are first noted. It may be observed that only four correlation coefficients in each region require examination. These compare the following variables for academic and public libraries: Volumes, Volumes per 1,000 Population, Numbers of Libraries, and Number of Libraries per

TABLE 8

LIBRARY VARIABLE CORRELATIONS
(Significant Relationships Only)

UNITED STATES

	1	2	3	4	5	6	7	8
1. Academic library volumes.								
2. Academic library vols. per 1,000.	.33							
3. Academic library numbers.	.93	--						
4. Academic libs. per 1,000,000.	--	.78	--					
5. Public library volumes.	.91	--	.90	--				
6. Public library vols. per 1,000.	--	.76	--	.72	--			
7. Public library numbers.	.89	--	.92	--	.95	--		
8. Public libraries per 1,000,000.	--	.71	--	.75	--	.84	--	

NORTHEAST REGION

	1	2	3	4	5	6	7	8
1. Academic library volumes.								
2. Academic library vols. per 1,000.	--							
3. Academic library numbers.	.94	--						
4. Academic libs. per 1,000,000.	--	.92	--					
5. Public library volumes.	.91	--	.92	--				
6. Public library vols. per 1,000.	--	.84	--	.87	--			
7. Public library numbers.	.89	--	.96	--	.95	--		
8. Public libraries per 1,000,000.	--	.83	--	.92	--	.87	--	

NORTHWEST REGION

	1	2	3	4	5	6	7	8
1. Academic library volumes.								
2. Academic library vols. per 1,000.	--							
3. Academic library numbers.	.75	--						
4. Academic libs. per 1,000,000.	--	--	--					
5. Public library volumes.	.71	--	.76	--				
6. Public library vols. per 1,000.	--	--	--	--	--			
7. Public library numbers.	--	--	--	--	.93	--		
8. Public libraries per 1,000,000.	--	--	--	--	--	.78	.68	

SOUTHEAST REGION

	1	2	3	4	5	6	7	8
1. Academic library volumes.								
2. Academic library vols. per 1,000.	.69							
3. Academic library numbers.	.92	--						
4. Academic libs. per 1,000,000.	--	.68	--					
5. Public library volumes.	.95	--	.87	--				
6. Public library vols. per 1,000.	.78	.65	.69	--	.82			
7. Public library numbers.	.94	--	.91	--	.91	.69		
8. Public libraries per 1,000,000.	--	--	--	--	--	--	--	

SOUTHWEST REGION

	1	2	3	4	5	6	7	8
1. Academic library volumes.								
2. Academic library vols. per 1,000.	--							
3. Academic library numbers.	.92	--						
4. Academic libs. per 1,000,000.	--	.63	--					
5. Public library volumes.	.87	--	.91	--				
6. Public library vols. per 1,000.	--	--	--	--	--			
7. Public library numbers.	.89	--	.95	--	.94	--		
8. Public libraries per 1,000,000.	--	--	--	.55	--	--	--	

1,000,000 Population. Correlations between variables of dissimilar categories appear to be unrealistic and these are not included in the discussion although each of the tables is presented with all significant correlations. Those correlations considered here are encircled in each regional presentation on Table 8. In addition they are presented separately in Table 9.

In observing Tables 8 and 9, for the United States and then for each of the four regions, the first item of note is the strength of several significant correlation coefficients. The greatest similarity in the pattern and values of significant correlations exists between that of the United States, fifty data points (SMSAs), and the Northeast region with nineteen data points (SMSAs).

TABLE 9

Correlations for Library Variables.

	Variable Pairs 1-5	2-6	3-7	4-8	Minimum value (significance)	No. of SMSAS
United States	.91	.76	.92	.76	.24	50
Northeast Region	.91	.84	.99	.92	.39	19
Northwest Region	.71	--	--	--	.67	7
Southeast Region	.95	.65	.91	--	.52	13
Southwest Region	.89	--	.95	.55	.48	11

In observing Table 9, the correlation coefficients between academic and public library volumes, variables 1 and 5, present the only complete set of significant correlations for all five regions. In at least one region a significant correlation is lacking for the other three sets of variable pairs. For library volume variables 1 and 5 their correlations are all very strong except for the Northwest. This region's lack of significant correlations is due in part to the limited number of data points available (seven). In addition, its economic and population growth represents the most recent of the four regions studied. Also, the sparsely populated hinterlands and less compact SMSAs have apparently led to fewer academic and public libraries. It appears that the competition provided by institutions in the older SMSAs

have attracted from the region both students and private funds that could have built more private academic libraries and also enlarged their collections. Public libraries are more system oriented and services have had to be tailored to a less geographically concentrated SMSA. The counties for the most part are larger in size the farther west the SMSA is located in the United States.

Academic and Public Library Volumes per 1,000., variables 2 and 6, with the strong showing of the United States and the Northeast and the weaker correlation of the Southeast, suggest that the older SMSAs have the most similarity in strength of all academic and public library collections. It may be responsible for the lack of significant correlations in the two western regions.

For Academic and Public Library Numbers, variables 3 and 7, the correlations are all very strong except for the Northwest's which are not significant. The numbers of both academic and public libraries show more variation, since the newest and smallest of the SMSAs included are located in this region.

Academic and Public Libraries per Million, variables 4 and 8, have no significant correlations in the Northwest and the Southeast. For the Northwest, the same reasons as for Academic and Public Library Numbers hold. In the Southeast, the SMSAs have had their major growth in the twentieth

century, especially, beginning with World War II. Rural dominated legislatures often located the few public colleges outside the SMSAs studied. The Civil War with its destruction of property - including library buildings, collections, and wealth, both public and private - may have contributed to the smaller size of collections and resulted in the loss of some libraries and a restriction or reduction in the number of libraries constructed after the War.

For the United States, all fifty SMSAs, the correlations are very strong. In addition to sample size, its correlations are similar to those of the Northeast in strength.

The Northeast contributes thirty-eight percent of the total SMSAs for this study. The oldest academic and public libraries were established in this area. The national banking center is located in this region. The largest and most concentrated population centers are in the Northeast. Public libraries are found everywhere, with many based in the smallest political subdivision.

The impact upon libraries in the Northwest and Southeast regions has been mentioned earlier. However, the Southwest has not. The Southwest's SMSAs developed later than those in the Northeast but several SMSAs became the financial centers for segments of this region because of a transportation lag due in part to the early methods used and the distances involved. Petroleum reserves are a major source of wealth

for this region. Public libraries are more system oriented, while academic libraries are often parts of state systems. Some important private academic institutions have developed.

All have contributed to the strength of the correlations for Academic and Public Library Volumes and Academic and Public Library Numbers (Table 9). When these are standardized with regard to population as in Academic and Public Library Volumes per Thousand and Academic and Public Libraries per Million the former's correlations are not significant and the latter's correlations are weak. The continued rapid population growth throughout this Sunbelt area is a major contributor. Most SMSAs in this region have a very limited number of large academic libraries. There are few medium-sized libraries. In California there are fewer private academic institutions. Here the state supported higher education system is dominant. Transportation distances and a strong dispersed junior college system may keep academic library size smaller, especially in California and some parts of Texas.

EVALUATION OF THE CORRELATION PATTERN OF PAIRING LIBRARY VARIABLES WITH SOCIO-ECONOMIC VARIABLES

For the socio-economic variable section, the discussion is based on the data in the original matrices concerning the correlation pattern obtained from the pairing of variables 1-8 **(library)** with variables 9-26 **(socio-economic)**. In this

chapter the relationships between library and socio-economic variables are evaluated, a major purpose of the analysis is to test the hypotheses proposed in Chapter One. They are: 1. The socio-economic character of the population in the selected SMSAs will relate to the collection size of both academic libraries and public libraries. 2. Academic library collection size reveals greater correspondence with these population characteristics than public library collection size. The socio-economic variables are examined by group. Each represents similar thematic characteristics and has been assembled in this manner for purposes of comparison. These groups are Education, General Characteristics, and Income/Housing.

The data from the original matrices for the five geographic areas are arranged and presented in terms of non-standardized and standardized library variables for each of the three thematic groups in the corresponding tables which follow. The internal library variable pattern has also been rearranged to facilitate direct comparison between academic and public library volume and numbers. Each thematic group's significant correlations is evaluated by geographic region, taking note of their individual patterns. A discussion of the correlation's relationship to the hypotheses formulated in Chapter One is included.

Education Variable Correlations

The significant correlations of the five education variables with the eight library variables are arranged again into the five spatial sets defined in Chapter Two. The five socio-economic variables included in the Education Group are listed in Table 10.

TABLE 10

Education Variables.

Variable 9 - Teacher per pupil ratio.

Variable 10 - High school graduates.

Variable 11 - Median school years completed.

Variable 12 - Dropouts, age 16-21.

Variable 13 - College graduates.

In observing Table 11 the overall pattern reflects the lack of significant correlations with the set of education variables. This is exhibited by the large number of blanks or non-significant correlations present.

Evaluation of the Hypotheses

In testing for the hypotheses in Table 11 we are concerned only with variables 1 and 2 for academic libraries and variables 5 and 6 for public libraries. The other four

TABLE 11

Correlations of Library and Education Variables
(Significant Relationships Only)

UNITED STATES

Non-standardized Library Variables.	Education Variables 9	10	11	12	13
1. Academic library volumes.	-.42	--	--	--	.31
5. Public library volumes.	-.44	--	--	--	--
3. Academic library numbers.	-.49	--	--	--	--
7. Public library numbers.	-.46	--	--	--	--

Standardized Library Variables.	Education Variables 9	10	11	12	13
2. Academic library vols. per 1,000.	--	--	--	-.39	--
6. Public library vols. per 1,000.	--	--	--	-.27	--
4. Academic libraries per 1,000,000.	--	--	--	--	--
8. Public libraries per 1,000,000.	--	--	--	-.36	--

NORTHEAST REGION

Non-standardized Library Variables.	Education Variables 9	10	11	12	13
1. Academic library volumes.	-.55	--	--	--	--
5. Public library volumes.	-.61	--	--	--	--
3. Academic library numbers.	-.60	--	--	--	--
7. Public library numbers.	-.69	--	--	--	--

Standardized Library Variables.	Education Variables 9	10	11	12	13
2. Academic library vols. per 1,000.	--	--	--	--	--
6. Public library vols. per 1,000.	--	--	--	--	--
4. Academic libraries per 1,000,000.	--	--	--	--	--
8. Public libraries per 1,000,000.	--	--	--	--	--

NORTHWEST REGION

Non-standardized Library Variables.	Education Variables 9	10	11	12	13
1. Academic library volumes.	--	--	-.67	--	--
5. Public library volumes.	--	--	--	--	--
3. Academic library numbers.	--	-.82	-.85	.72	--
7. Public library numbers.	--	--	--	--	--

Standardized Library Variables.	Education Variables 9	10	11	12	13
2. Academic library vols. per 1,000.	--	--	--	--	--
6. Public library vols. per 1,000.	--	--	--	--	--
4. Academic libs. per 1,000,000.	--	--	--	--	--
8. Public libraries per 1,000,000.	--	--	--	--	--

SOUTHEAST REGION

Non-standardized Library Variables.	Education Variables 9	10	11	12	13
1. Academic library volumes.	--	--	--	-.55	.84
5. Public library volumes.	--	--	--	-.57	.84
3. Academic library numbers.	--	--	--	--	.73
7. Public library numbers.	--	--	--	--	.75

Standardized Library Variables.	Education Variables 9	10	11	12	13
2. Academic library vols. per 1,000.	--	-.76	--	--	--
6. Public library vols. per 1,000.	--	-.67	--	--	.54
4. Academic libs. per 1,000,000.	--	-.63	--	--	--
8. Public libraries per 1,000,000.	--	-.69	-.54	--	--

SOUTHWEST REGION

Non-standardized Library Variables.	Education Variables 9	10	11	12	13
1. Academic library volumes.	--	--	--	--	--
5. Public library volumes.	--	--	--	--	--
3. Academic library numbers.	--	--	--	--	--
7. Public library numbers.	--	--	--	--	--

Standardized Library Variables.	Education Variables 9	10	11	12	13
2. Academic library vols. per 1,000.	--	--	--	--	.67
6. Public library vols. per 1,000.	--	--	--	--	--
4. Academic libs. per 1,000,000.	--	--	--	--	--
8. Public libraries per 1,000,000.	--	--	--	-.48	--

library variables are related to institutional numbers and provide a method other than volume count to facilitate the evaluation of the relationship of library variables with socio-economic variables.

The lack of significant correlations makes difficult the drawing of any conclusions other than that both hypotheses are not valid for any of the education variables either individually or by geographic region.

Geographic Area Correlation Patterns

It is worth mentioning the instances in which complete sets of significant correlations are found for any

socio-economic variable with any non-standardized or standardized library variable in a specific geographic region.

To evaluate the correlations presented in Table 11 the data for all fifty SMSAs, the United States set, are first noted. Significant correlations for all non-standardized library variables with variable 9, Teacher Per Pupil Ratio, are shown. The negative sign indicates correlation in the inverse manner described at the beginning of this chapter. This is correct since the lower the teacher per pupil ratio, the better the educational situation. Also, no significant difference is observed between academic and public library variables, either by collection size or number of volumes. The strength of the correlations is moderate, suggesting that SMSAs with fewer pupils per classroom also have more libraries and larger library collections. This is true for both public and academic libraries.

The Northeast region exhibits a correlation pattern similar to that of the nation as a whole with variable 9. The correlations with public library volumes and numbers are slightly stronger that those for the corresponding academic library variables, but the difference is of little significance.

The other correlation pattern of note is in the Southeast region. It occurs between variable 13, College Graduates, and the non-standardized library variables. The strong

positive correlations suggest that the number of college graduates seems to relate directly to library collection size and the number of libraries in this region. For the other geographic regions the results are not significant.

Summary - Hypotheses and the Education Group

In summary, both hypotheses are not supported for any of the library variables, either non-standardized or standardized, across all geographic regions or for any individual region because of the lack of significant correlations with education variables.

This situation is especially true for the Northeast region. Here the only significant educational variable is Teacher per Pupil Ratio, which appears to be related to the the collection size and number of academic and public libraries. No other education variable reveals a relationship with either the size of library collections or number of libraries present in the nineteen SMSAs of this region. Since the Northeast provides such a significant portion of the total SMSAs included in this research, its lack of significant correlations probably influences the lack of correlations in the United States or total pattern.

Correlations with the General Characteristics Group

The significant correlations of the seven general socio-economic variables with the eight library variables are arranged into the same five regions used in the Education Group. These seven socio-economic variables are listed in Table 12.

TABLE 12

General Variables.

Variable 14. SMSA Population.

Variable 15. Physicians per 100,000.

Variable 16. Crime, Rate per 100,000.

Variable 17. Republican Vote for President, 1972.

Variable 18. Social Security Recipients.

Variable 19. Social Security Recipients per 1,000.

Variable 20. Land Area in Square Miles.

The significant correlations of the library variables with the general socio-economic variables for the five geographic regions are presented in Table 13.

For Table 13 the lack of significant correlations is again apparent except for two of the five regions, the United States and the Northeast region. Also, for several socio-economic variables in this group, a few sets of significant correlations appear in three or more regions.

TABLE 13

Correlations of Library and the General Variables
(Significant Relationships Only)

UNITED STATES

Non-standardized Library Variables	General Variables 14	15	16	17	18	19	20
1. Academic library volumes.	.82	.56	--	-.47	.82	--	--
5. Public library volumes.	.90	.52	--	-.46	.90	--	--
3. Academic library numbers.	.92	.47	--	-.41	.92	--	--
7. Public library numbers.	.92	.47	--	-.46	.92	--	--

Standardized Library Variables	General Variables 14	15	16	17	18	19	20
2. Academic lib. vols. per 1,000.	--	.25	-.29	-.30	--	.51	--
6. Public library vols. per 1,000.	--	--	-.32	-.26	--	.74	--
4. Academic libs. per 1,000,000.	--	--	-.24	--	--	.74	--
8. Public libraries per 1,000,000.	--	--	-.43	-.26	--	.67	--

NORTHEAST REGION

Non-standardized Library Variables	General Variables 14	15	16	17	18	19	20
1. Academic library volumes.	.79	.75	--	-.47	.82	--	--
5. Public library volumes.	.88	.76	--	-.39	.91	--	--
3. Academic library numbers.	.92	.67	--	-.44	.95	--	--
7. Public library numbers.	.94	.72	--	--	.95	--	--

Standardized Library Variables	General Variables 14	15	16	17	18	19	20
2. Academic lib. vols. per 1,000.	--	--	--	--	--	.78	--
6. Public library vols. per 1,000.	--	--	--	--	--	.94	--
4. Academic libs. per 1,000,000.	--	--	--	--	--	.91	--
8. Public libraries per 1,000,000.	-.44	--	--	--	--	.87	--

NORTHWEST REGION

Non-standardized Library Variables	General Variables 14	15	16	17	18	19	20
1. Academic library volumes.	.79	--	--	--	.70	--	--
5. Public library volumes.	.92	--	--	--	.86	--	--
3. Academic library numbers.	.93	--	--	--	.93	--	--
7. Public library numbers.	.81	--	--	--	.75	--	--

Standardized Library Variables	General Variables 14	15	16	17	18	19	20
2. Academic lib. vols. per 1,000.	--	--	--	.85	--	--	--
6. Public library vols. per 1,000.	--	--	--	--	--	--	--
4. Academic libs. per 1,000,000.	--	--	--	--	--	--	-.84
8. Public libraries per 1,000,000.	--	--	--	--	--	--	--

SOUTHEAST REGION

Non-standardized Library Variables	General Variables 14	15	16	17	18	19	20
1. Academic library volumes.	.94	--	--	-.58	--	-.58	--
5. Public library volumes.	.95	--	--	-.67	--	-.52	--
3. Academic library numbers.	.91	--	--	--	.56	--	--
7. Public library numbers.	.91	--	--	--	--	-.60	.55

Standardized Library Variables	General Variables 14	15	16	17	18	19	20
2. Academic lib. vols. per 1,000.	--	--	-.56	--	--	-.62	.63
6. Public library vols. per 1,000.	.65	--	-.55	-.57	--	-.74	--
4. Academic libs. per 1,000,000.	--	--	--	--	--	--	.73
8. Public libraries per 1,000,000.	--	--	-.89	--	--	-.59	.58

SOUTHWEST REGION

Non-standardized Library Variables	General Variables 14	15	16	17	18	19	20
1. Academic library volumes.	.85	.58	--	--	.84	--	--
5. Public library volumes.	.94	--	--	--	.96	--	--
3. Academic library numbers.	.90	--	--	--	.91	--	--
7. Public library numbers.	.93	--	--	--	.95	--	--

Standardized Library Variables	General Variables 14	15	16	17	18	19	20
2. Academic lib. vols. per 1,000.	--	.52	--	-.54	--	--	--
6. Public library vols. per 1,000.	--	--	--	--	--	--	--
4. Academic libs. per 1,000,000.	--	--	--	--	--	--	--
8. Public libraries per 1,000,000.	--	--	--	-.57	--	--	--

Regional Correlation Patterns

In observing the national data set for both standardized and non-standardized variables exactly 50% or 28 of 56 correlations are significant. Most of these correlations are with the non-standardized library variables. Of note is the nearly identical set of correlations with the non-standardized library variables between the United States and the Northeast region. Again, the most important contributing factor for this similarity may be the presence of 38% of the SMSAs in the Northeast.

The Northwest and Southwest regions also exhibit similar patterns of correlations between the non-standardized library variables and the general variable group. It is

this similarity plus the presence of only a few significant correlations when compared with those of the two eastern regions that suggests some major differences. These may be related to the more recent development of the western regions.

In all five geographic areas, complete groups of significant correlations exist between the non-standardized library variables and SMSA Population, variable 14. This serves to emphasize the fact that the number of libraries and the size of their collections are related to the size of the SMSA's population. A similar relationship is observed with variable 18, Social Security Recipients, for all geographic regions except the Southeast. Social Security Recipients, variable 18, acts as a subset of the population. It is important to note that the individual correlation values are identical for the United States for variables 14 and 18.

Individual Variable Patterns

Each individual variable exhibits its own pattern except for the major similarity noted above. The significance of variable 14, SMSA Population, is clearly evident. Its complete group of strong to very strong correlations with the non-standardized library variables are supported for all five geographic regions. This suggests that SMSA Population has a direct relationship with library numbers and collection size.

For variable 18, Social Security Recipients, strong, significant correlations are maintained in all regions except the Southeast. The above average number of recipients in contrast to the the lowest mean population in the Southeast is probably responsible.

Physicians per 100,000 Population, variable 15, has all significant correlations of moderate value for both the United States and the Northeast.

Variable 16, Crime Rate per 100,000 Population has moderate to very weak correlations. The correlations for the United States with standardized library variables is the only complete group of significant correlations produced. These negative correlations suggest that where crime rates are lower, library collections and numbers tend to be larger and vice versa.

Percent Republican Vote for President in 1972, variable 17, has only one complete group of significant correlations. It occurs in the United States region with the non-standardized library variables. These correlations are negative.

Social Security Recipients per 1,000, variable 19, maintains complete groups of significant correlations with standardized library variables for the United States and the Northeast region. These positive correlations are moderate to strong for the United States and strong to very strong

for the Northeast. However, in the Southeast six negative correlations are found. The presence of these negative correlations suggest that for SMSAs where Social Security recipients are more concentrated the numbers of library volumes per 1,000 population tend to decrease and vice versa. For the Southeast region a smaller income may be responsible for the limitations or smaller size of library collections and numbers of public libraries. The Northeast's strong positive correlations with population suggest that this segment of the population must have larger Social Security payments and additional or outside sources of income. Contributing to the above may be the prevalence of higher salaries and wages for the population of this region.

Variable 20, Land Area in Square Miles, has very few significant correlations. So, for this study the physical size of the SMSA has no significant relationship with any of the library variables used.

Summary - Hypotheses and the General Characteristics Group

In evaluating the first hypothesis for this group only two of the five geographic regions contain 50% or more significant correlations. These findings provide some support for the first hypothesis.

A test for the second hypothesis, as described in the section on education variable correlations, will only be

possible for the United States and Northeast region as the other regions contain too few significant correlations. For the United States, academic and public library correlations are essentially equivalent since in only one of eight groups is there a large difference in the value of the correlations. In one of the other groups, the correlations are very weak with variable 2, Academic Library Volumes per 1,000., and not significant with variable 6, Public Library Volumes per 1,000.

The situation for library numbers is essentially the same since in only one of seven groups is there a large difference in the value of the significant correlations. Other correlations are very weak with variable 8, Public Libraries per Million, and not significant with variable 4, Academic Libraries per Million. Both suggest that public library correlations could be slightly stronger.

The Northeast region's situation is similar to that of the United States, except fewer groups of significant correlations are involved. Volume number correlations have only five such groups. In only one instance does public library volumes have much stronger correlations. For library numbers six possible groups having at least one correlation are found. In two instances only one significant correlation is present. One of these is with academic library numbers, the other with public library numbers.

So, for the Northeast region only the slightest hint is given that public library volume correlations are stronger. With library numbers the correlations seem equivalent.

Correlations of the Income/Housing Group

The significant correlations of the six income and housing variables with the eight library variables are arranged into the same five spatial sets used for the analysis of the two previous groups. These six socio-economic variables are listed in Table 14.

TABLE 14

Income/Housing Variables.

Variable 21. Income per square mile.
Variable 22. Per capita income.
Variable 23. Per capita retail sales.
Variable 24. Local gov. expenditures.
Variable 25. Owned housing units.
Variable 26. Owner occup., over 1.01 persons/room.

Regional Correlation Patterns

The significant correlations of the library variables with the Income/Housing Group of the socio-economic variables are presented in Table 15 for all five areas.

TABLE 15

Correlations of Library and Income/Housing Variables
(Significant Relationships Only)

UNITED STATES

Non-standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
1. Academic library volumes.	.70	.44	--	.44	-.61	--
5. Public library volumes.	.84	.55	--	.55	-.60	--
3. Academic library numbers.	.77	.47	--	.46	-.58	--
7. Public library numbers.	.80	.59	--	.58	-.53	--
Standardized Library variables.	**Income/Housing Variables 21**	**22**	**23**	**24**	**25**	**26**
2. Academic lib. vols. per 1,000.	--	--	-.24	--	--	--
6. Public library vols. per 1,000.	--	--	-.31	--	--	--
4. Academic libs. per 1,000,000.	--	--	-.27	--	--	--
8. Public libraries per 1,000,000.	--	--	-.35	.24	--	-.38

NORTHEAST REGION

Non-standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
1. Academic library volumes.	.71	--	--	--	-.67	--
5. Public library volumes.	.89	.52	--	.54	-.68	--
3. Academic library numbers.	.80	.40	--	.43	-.66	--
7. Public library numbers.	.88	.58	--	.55	-.62	--
Standardized Library variables.	**Income/Housing Variables 21**	**22**	**23**	**24**	**25**	**26**
2. Academic lib. vols. per 1,000.	--	-.42	--	--	--	--
6. Public library vols. per 1,000.	--	--	--	--	--	--
4. Academic libs. per 1,000,000.	--	--	-.40	--	--	--
8. Public libraries per 1,000,000.	--	--	--	--	--	-.46

NORTHWEST REGION

Non-standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
1. Academic library volumes.	--	--	--	--	--	--
5. Public library volumes.	.78	--	--	--	--	--
3. Academic library numbers.	.89	--	--	--	--	--
7. Public library numbers.	.81	.69	--	--	--	--

Standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
2. Academic lib. vols. per 1,000.	--	-.68	--	--	--	--
6. Public library vols. per 1,000.	--	--	--	--	--	--
4. Academic libs. per 1,000,000.	--	--	--	--	--	--
8. Public libraries per 1,000,000.	--	--	--	--	--	--

SOUTHEAST REGION

Non-standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
1. Academic library volumes.	.70	.61	--	.77	-.65	--
5. Public library volumes.	.81	.61	--	.81	-.66	--
3. Academic library numbers.	.56	--	--	.67	--	--
7. Public library numbers.	.60	--	--	.60	-.59	--

Standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
2. Academic lib. vols. per 1,000.	--	--	--	--	--	--
6. Public library vols. per 1,000.	--	--	-.60	--	-.61	--
4. Academic libs. per 1,000,000.	--	--	--	--	--	--
8. Public libraries per 1,000,000.	--	--	-.70	--	--	--

SOUTHWEST REGION

Non-standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
1. Academic library volumes.	.55	.74	--	.53	-.65	--
5. Public library volumes.	.55	.55	--	--	-.74	--
3. Academic library numbers.	.52	.66	--	--	-.65	--
7. Public library numbers.	.52	.61	--	.52	-.64	--

Standardized Library variables.	Income/Housing Variables 21	22	23	24	25	26
2. Academic lib. vols. per 1,000.	--	--	--	.49	--	--
6. Public library vols. per 1,000.	--	--	--	--	--	--
4. Academic libs. per 1,000,000.	--	--	-.50	--	--	--
8. Public libraries per 1,000,000.	--	--	--	.68	--	-.52

All regions except the Northwest contain significant correlations with non-standardized library variables. Excluding the Northwest, all have significant correlations with the same four income and housing variables. They are variable 21, Income per Square Mile; variable 22, Per Capita Income; variable 24, Local Government Expenditures; and variable 25, Owned Housing Units.

For standardized library variables only a few weak significant correlations with library variables are noted. The only complete group of correlations is found in the United States.

As mentioned in the the evaluation of the General Variables Group, the similarity of patterns between the United

States and the Northeast is noted, especially if only the non-standardized variables are utilized. In addition the pattern of significant correlations with non-standardized library variables exhibits some similarity with the Southeast and the Southwest regions. With the United States and the Northeast regions the similarity even extends to the pattern of correlation strength of public library variables over academic library variables. In the Southeast only two of the seven groups reveal stronger public library correlations. For the Southwest one set has stronger academic library variables. In two other instances a lack of one significant correlation within the pair is noted. One is with academic volumes, the other with public volumes.

Individual Variable Patterns

In the analysis of this group large numbers of significant correlations are noted, especially for variables 21, 22, 24, and 25. Except for variables 23 and 26 most correlations are with the non-standardized library variables. The presence of so many significant correlations conveys the existence of some type of relationship between these socio-economic measures and the library variables used.

Variable 21, Income per Square Mile, has significant correlations with non-standardized library variables. The strength of the correlations vary considerably. Those in

the United States and the Northeast regions are strong to very strong, the Northwest's from non-existent to very strong, the Southeast's from weak to strong, and the Southwest's are all quite weak. This suggests that SMSAs with higher incomes will have more libraries with larger collections. This statement is supported for all five regions.

Per Capita Income's or variable 22's significant correlations with non-standardized library variables provide a weaker pattern than that of Income per Square Mile, variable 21. The United States' and the Southwest region's correlations are all significant. The Northeast's and Southeast's correlations are not all significant. The significant correlations' strength ranges from moderate to very weak. The expectation that higher income was related to increased numbers of libraries and library collection size shows a varied pattern when evaluated by region.

Operating inversely, Per Capita Retail Sales, variable 23, reveal few, significant correlations with standardized library variables. The United States region's correlations are weak to very weak. Several, scattered, weak to very weak significant correlations are noted in the Northeast, Southeast, and Southwest regions.

Variable 24, Local Government Expenditures, has a pattern of significant correlations identical in numbers and strength to that of Per Capita Income for the United States

and the Northeast. For the Northwest region the correlation pattern with Per Capita income is nearly identical. All are not significant except for a single very weak one. The Southeast region's pattern of moderate to strong significant correlations in nearly identical to that of Income per Square Mile, variable 21. However, the correlations with both variables are significantly stronger for library volumes than library numbers. For the Southwest several moderate to weak significant correlations exist. Increasing local government expenditures suggest that additional funds will be available for the support of libraries and library collections. As expected, the correlations for the United States and the Northeast region reveal a stronger relationship with the public library variables. This occurred because public libraries are directly supported by tax revenues while college and university support, in addition to tuition, usually comes from statewide taxation and/or gifts.

Owned Housing Units, variable 25, operates inversely as the signs of all correlations are negative. Its correlations with standardized library variables are all significant except in the Southeast and the Northwest. No significant correlations exist in the Northwest region. The United States, Northeast, and Southwest correlations are of moderate strength, while in the Southeast they are weak to nonexistent. The moderately strong correlations suggest that SMSAs with larger numbers of owner occupied housing units

are near fewer libraries which have relatively smaller collection sizes.

Variable 26, Owner Occupied with More Than One Person per Room, has only three scattered, weak significant correlations. This suggests that an absence of an association exists between size of library collections and this variable.

Summary - Hypotheses and the Income/Housing Group

In evaluating the hypotheses with this group of socio-economic variables, the large numbers of significant correlations suggest the conclusion that the first hypothesis does apply.

In observing Table 15 for an examination of the second hypothesis, the paring of significant correlations with academic and public library volume and library number variables are used. For the non-standardized library variables the similarity between the United States and the Northeast regions is worth noting. In this instance five of the eight possible pairings reveal a strong increase in strength for correlations with public library variables over academic library variables. Also, the increases occur with the identical socio-economic variables in both the United States and the Northeast regions.

A comparison of academic library volume correlations with public library volume correlations shows the latter's correlations to be stronger at the national level. In library numbers only two of the four pairings exhibit stronger correlations with public library numbers. This results in the second hypothesis being rejected for both library numbers and volumes for the United States.

The results for the Northeast are very similar as noted earlier. The only change is that the correlation between variables 1 and 22, Academic Library Volumes and Per Capita Income, and variables 1 and 24, Academic Library Volumes and Local Government Expenditures, are not significant in this region. The identical conclusions are made concerning both hypotheses for the Northeast.

Both hypotheses are rejected for the Northwest region because of the lack of significant correlations.

For the Southeast region a comparison of academic library volume correlations with public library volume correlations shows only one of the four pairs of correlations to be significantly stronger for public libraries. For library numbers only one of the three pairings exhibit stronger correlations with Public Library Numbers. The pairing between variables 3 and 25, Academic Library Numbers and Owned Housing Units, and variables 7 and 25, Public library Numbers and Owned housing Units, has only a significant correlation

with Public Library Numbers. This results in the second hypothesis being rejected for both library numbers and volumes for the Southeast.

For the Southwest region a comparison of academic library volume correlations with public library volume correlations has two of the four pairs of correlations significantly stronger for academic libraries. For library numbers only one of the four pairings exhibit stronger correlations with public library numbers. This pairing between variables 3 and 24, Academic Library Numbers and Local Government Expenditures, and variables 7 and 24, Public Library Numbers and Local Government Expenditures, has the situation in which the former's correlation is not significant. In contrast to the Southeast all four correlations with standardized library variables are split equally, two with academic and two with public library variables. This results in the second hypothesis being upheld for this region.

RELATIONSHIP TO HYPOTHESES AND SUMMARY

The tables presented below provide one method of summary evaluation. They tend to highlight the regional similarities and differences, especially, those between the four regions and the United States (all 50 SMSAs). One significant observation is that few correlations exist between standardized library variables and socio-economic variables

that are of a non-standardized format and vice versa. Also, the similarity in numbers and occurrence of significant correlations between the United States and the Northeast regions is noteworthy.

The previous discussions concerning the validity of the hypotheses in the individual groups have been limited in scope. (In the various regions the hypotheses have often been evaluated in terms of correlations with either non-standardized or standardized library variables.)

Table 16 clearly exhibits the lack of significant

TABLE 16

Education Variables - Significant Correlations.

GEOGRAPHIC AREA	CORRELATIONS	
	Non-standardized 20 maximum	Standardized 20 maximum
United States	5	3
Northeast	4	0
Northwest	4	0
Southeast	6	6
Southwest	0	2

correlations with any of the education variables. The heterogeneity of the educational attainment of the population in the component areas of the SMSA are probably responsible for the lack of significant correlations. On a regional basis, the variations between the SMSAs and even within them must contribute. The divergent variations of the individual

education correlations between the five geographic regions are underscored by noting the variation from the United States mean as shown in Table 5 of the four individual regions established.

In Table 17 a pattern of similarity is present for three

TABLE 17

General Variables - Significant Correlations.

GEOGRAPHIC AREA	CORRELATIONS	
	Non-standardized 28 maximum	Standardized 28 maximum
United States	16	12
Northeast	15	5
Northwest	8	2
Southeast	11	11
Southwest	9	3

of the geographic regions in that the total number of non-standardized significant correlations is at least three times that of those with standardized variables. The one exception is the Southeast. Its pattern of regional development probably is the major determinant associated with the finding.

Table 18 clearly points out the lack of correlations for the Northwest region. One probable cause may be related to the lack of large SMSAs. This is due to its having a much smaller population with the lack of economic activity to foster larger populations except for the seven SMSAs included.

TABLE 18

Income/Housing Variables - Significant Correlations.

GEOGRAPHIC AREA	CORRELATIONS	
	Non-standardized 24 maximum	Standardized 24 maximum
United States	16	6
Northeast	14	3
Northwest	4	1
Southeast	13	3
Southwest	14	4

In reviewing these three tables the number of significant correlations almost always decreases when observing the correlations with standardized library variables and also the correlations with non-standardized library variables. For the United States, the Northeast, and the Northwest this situation always holds. However, with the other regions several exceptions occur. These are in the Education and the General Variables Groups. The Southeast region is the major exception. In this region both groups present an equal number of significant correlations with both standardized and non-standardized library variables. However, it is important to note that for this region the normal pattern of fewer correlations with standardized library variables for the Income/Housing Group is followed. Also, in the Education Group the Southwest has two significant correlations with standardized library variables and none with any of the non-standardized variables. The very few significant correlations makes any attempt at an explanation extremely tenuous.

In summarizing the evaluation of the hypotheses, the grouping or selection of the correlations used is significant. Only the most general situations will be considered. For the first hypothesis, "The socio-economic character of the population in the selected SMSAs will relate to the collection size of both academic libraries and public libraries," the preceding discussions by groups of socio-economic variables have found that the pattern of significant correlations varies by group. In summary, this hypothesis is not completely supported for the Education Variables Group. However, it is supported for only two geographic regions of the General Variables Group and for four of the five regions of the Income/Housing Variables Group. Combining the statistics for the three groups of socio-economic variables and looking only at the correlations with the non-standardized library variables we find that for both the United States and the Northeast sets at least 50% of the correlations are significant. For the other three regions the number of significant correlations is less than 50%. One important contributing factor is the lack of data points (SMSAs) in these three geographic regions.

For a complete evaluation of the first hypothesis the correlations for all three groups of library collection variables are evaluated. With the larger numbers of significant correlations present in the broadest region, the United States, we conclude that this hypothesis has some

support. The Northeast is the closest of the smaller regions with only slightly fewer significant correlations present. The Southeast's support of the first hypothesis is slightly less than that of the Northeast. For the Southwest region the support is less. The Northwest supplies the least amount of support, much less than that of the Southwest.

In evaluating the second hypothesis, "Academic library collection size reveals greater correspondence with these population characteristics than public library collection size," only the United States spatial set will be considered. As mentioned earlier in this chapter in the discussion relating to Education variables, only the significant correlations with library variables 1 and 2, Academic Library Volumes and Academic Volumes per 1,000., for academic libraries and variables 5 and 6, Public Library Volumes and Public Library Volumes per 1,000., for public libraries are pertinent to this discussion. Based on the total number of significant correlations for each type of library this hypothesis is not confirmed because of their similar numbers and lack of variation in value. Academic libraries have sixteen such correlations to the public libraries fourteen. Similar evaluations may be made for the four regional sets. However, this pattern may not hold. In any case using the data from some of the regions for comparisons may be meaningless since there is a shortage of data points (large SMSAs) in them.

Chapter IV

REGRESSION ANALYSIS OF LIBRARY AND SOCIO-ECONOMIC VARIABLES

INTRODUCTION TO REGRESSION ANALYSIS

Additional information to aid in the interpretation of the relationships between library and socio-economic variables is provided in this chapter. Stepwise regression analysis is performed on the variable set to assess the degree of covariation. This is accomplished utilizing the two groups of variables - **library**, variables 1 through 8, and **socio-economic**, variables 9 through 26 - as initially described in Chapter One. The library group operates as dependent variables, with the socio-economic group as independent variables. Appendix C presents the results, by library variable, for each geographic region. The independent variables are arranged in order of significance by cumulative value of R^2, the coefficient of determination, being a measure of the closeness of fit in regression analysis.

The examination of these data is by pairs of identical academic and public library variables. This provides a structure for the additional discussion of the hypotheses

formulated in Chapter One. The first hypothesis notes that the socio-economic character of the selected SMSAs relates to the size of both academic and public library collections. The second hypothesis suggests that academic library collection size exhibits greater correspondence than public library collection size with these socio-economic characteristics, or, their correlation more closely approach the value of 1.00.

SOCIO-ECONOMIC CONTRIBUTIONS TO LIBRARY VARIABLE EXPLANATION

Four groupings of the library variables, variables 1 thru 8, are used. They are library collection size, library collections per 1,000 population, library numbers, and library numbers per 1,000 population. Within each group the explanation provided by the top three independent variables for each geographic region is evaluated. Academic library interpretations are discussed before those of the public library. To improve the understanding of these complex statistics, a graphic format has been devised to present the data by geographic regions for each of the eight library variables. These are presented in the figures included in the following sections.

Library Collection Size

This section contains an evaluation of the data presented in Figures 3 and 4 for variables 1 and 5 respectively. For Academic Library Volumes - variable 1, the greatest amount of explanation is made by size - as SMSA Population - variable 14 and Social Security Recipients - variable 18, may be interpreted. Size provides over sixty percent of the explanation in all geographic regions for this variable. Another source of interpretation is provided by income, as suggested by variable 15 - the Number of Physicians Per 100,000 Population; variable 24 - Local Government Expenditures; and variable 22 - Per Capita Income in four geographic regions. Providing additional explication is the political orientation of a region as noted by variable 17 - Percent Republican Vote for President, in the Northwest. Another source of explanation is education, as suggested by these variables: Dropouts--Age 16 to 21 - variable 12, and High School Graduates - variable 10. The emphasis the Northwest places on education is highlighted by the lowest percentage of dropouts and the highest percentage of High School Graduates among the four regions of the United States.

The variations in Public Library Volumes - variable 5, as shown in Figure 4, are associated with many of the same socio-economic variables. Three items contribute most to

STEPWISE REGRESSION - ACADEMIC LIBRARY VOLUMES - VARIABLE 1

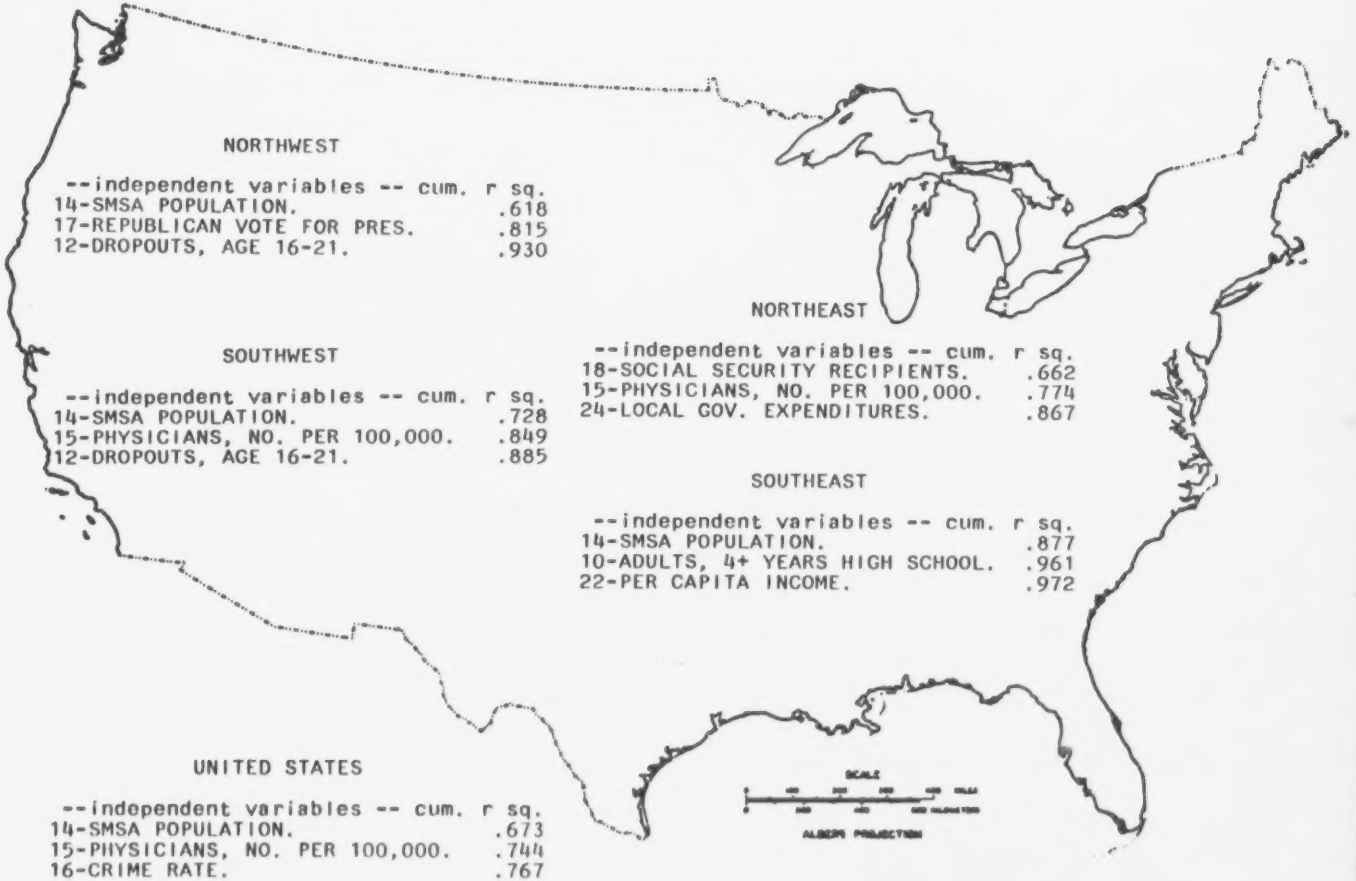
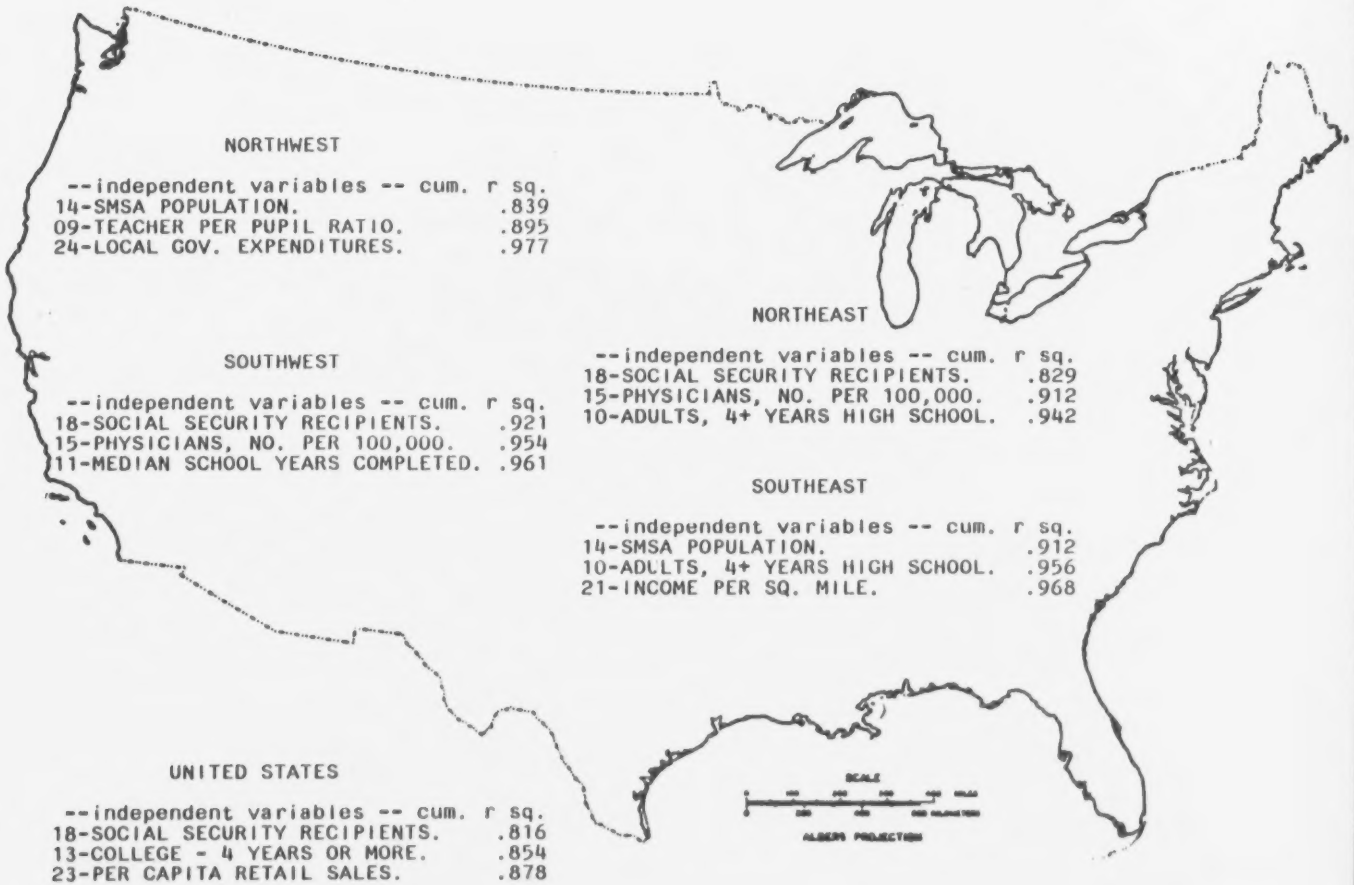


Figure 3

STEPWISE REGRESSION - PUBLIC LIBRARY VOLUMES - VARIABLE 5



NORTHWEST

--independent variables --	cum. r sq.
14-SMSA POPULATION.	.839
09-TEACHER PER PUPIL RATIO.	.895
24-LOCAL GOV. EXPENDITURES.	.977

NORTHEAST

--independent variables --	cum. r sq.
18-SOCIAL SECURITY RECIPIENTS.	.829
15-PHYSICIANS, NO. PER 100,000.	.912
10-ADULTS, 4+ YEARS HIGH SCHOOL.	.942

SOUTHWEST

--independent variables --	cum. r sq.
18-SOCIAL SECURITY RECIPIENTS.	.921
15-PHYSICIANS, NO. PER 100,000.	.954
11-MEDIAN SCHOOL YEARS COMPLETED.	.961

SOUTHEAST

--independent variables --	cum. r sq.
14-SMSA POPULATION.	.912
10-ADULTS, 4+ YEARS HIGH SCHOOL.	.956
21-INCOME PER SQ. MILE.	.968

UNITED STATES

--independent variables --	cum. r sq.
18-SOCIAL SECURITY RECIPIENTS.	.816
13-COLLEGE - 4 YEARS OR MORE.	.854
23-PER CAPITA RETAIL SALES.	.878

Figure 4

the variation for this variable - size, education, and income. Size, representing Social Security Recipients - variable 18, and SMSA Population - variable 14, accounts for over 80% of the total variation in the dependent variable in each of the five geographic regions. Educational factors are given by the four different socio-economic variables found in the education group as mentioned in Chapter Three. Income's variability is derived from the Number of Physicians Per 100,000 Population - variable 15 (two regions); Income Per Square mile - variable 21; Per Capita Retail Sales - variable 23; and Local Government Expenditures - variable 24. Even though the major sources of variation for public library collection size come from three different socio-economic items; size, education, and income, size appears to be the most important.

Without exception, size accounts for the major portion of the variability for the growth of academic and public library collections. Income is second, and adds less than twenty percent to the variation in each geographic region. The amount of additional interpretation provided by income for public library variation is about half that given for academic library collections. Education's additional predictor value on R^2 was even less than that of income in the stepwise models used.

In support of the first hypothesis, the strength or high value for R^2 in each geographic region for both library collection variables is noted. With the exception of the Southeast region, public library collection size has the greater explanation of variation than academic library collection size. In this region the total variation for academic libraries is slightly stronger than that for public libraries. The low average collection size observed (Appendix B) for library variables 1 and 5 in the Southeast region suggests one possible explanation. Based on percent of total variation, when academic and public library collection size is noted, the second hypothesis is not upheld.

Library Collections per 1,000 Population

This section evaluates the statistics presented in Figures 5 and 6. Variable 2 - Academic Library Collections per 1,000 Population, is obtained by dividing variable 1, Academic Library Volumes, by the population of the SMSA involved to remove the influence of population size. With size factored out, a greater number of socio-economic variables provided the variation for each dependent variable than those noted for variable 1 in the preceding section. Social Security recipients, education, income, and politics, variously, provide the variation among the five geographic regions. Combining the individual amounts of variation for all regions, the similarity in the amount of

STEPWISE REGRESSION - ACADEMIC LIBRARY VOLUMES PER THOUSAND - VARIABLE 2

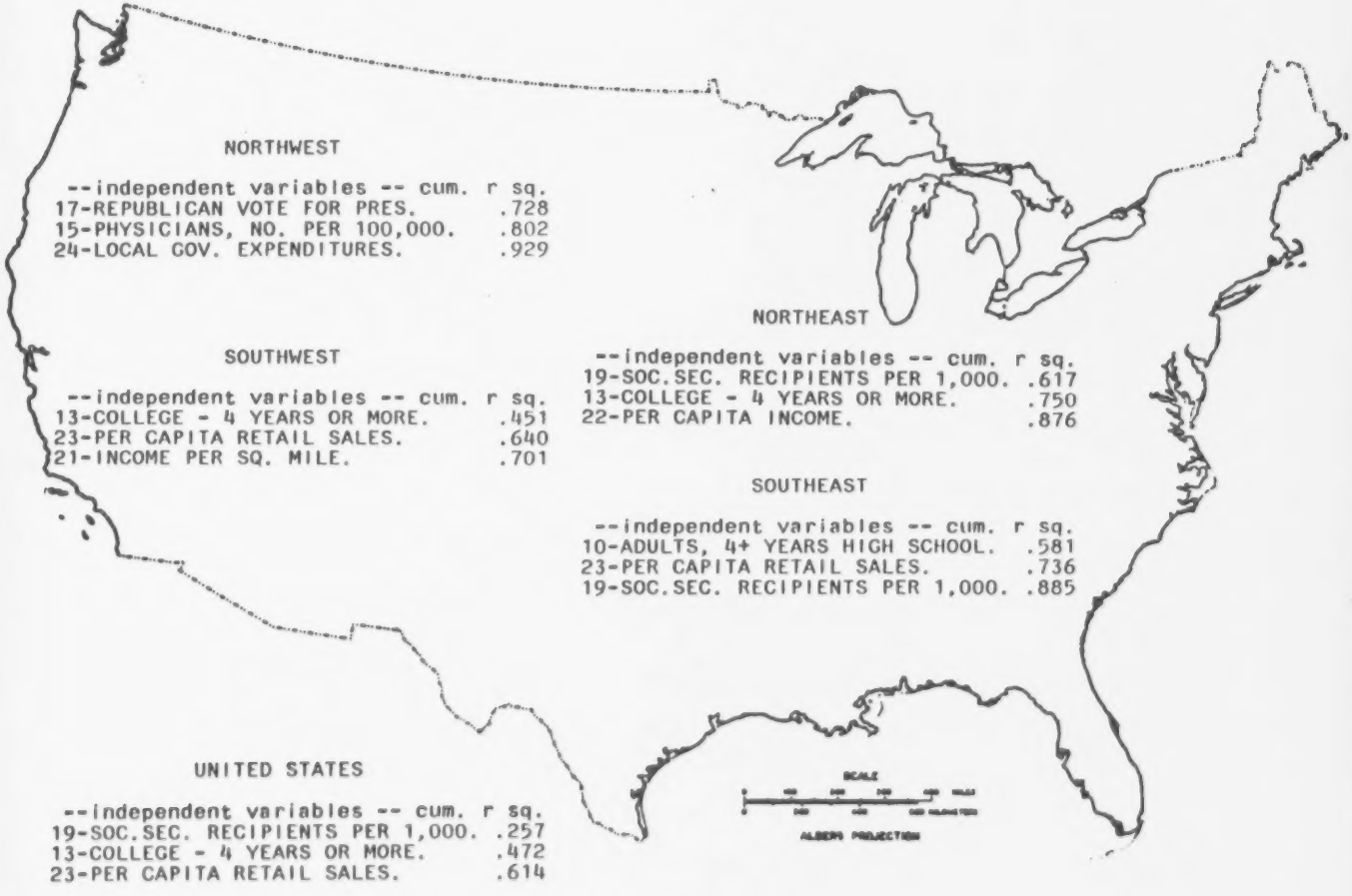
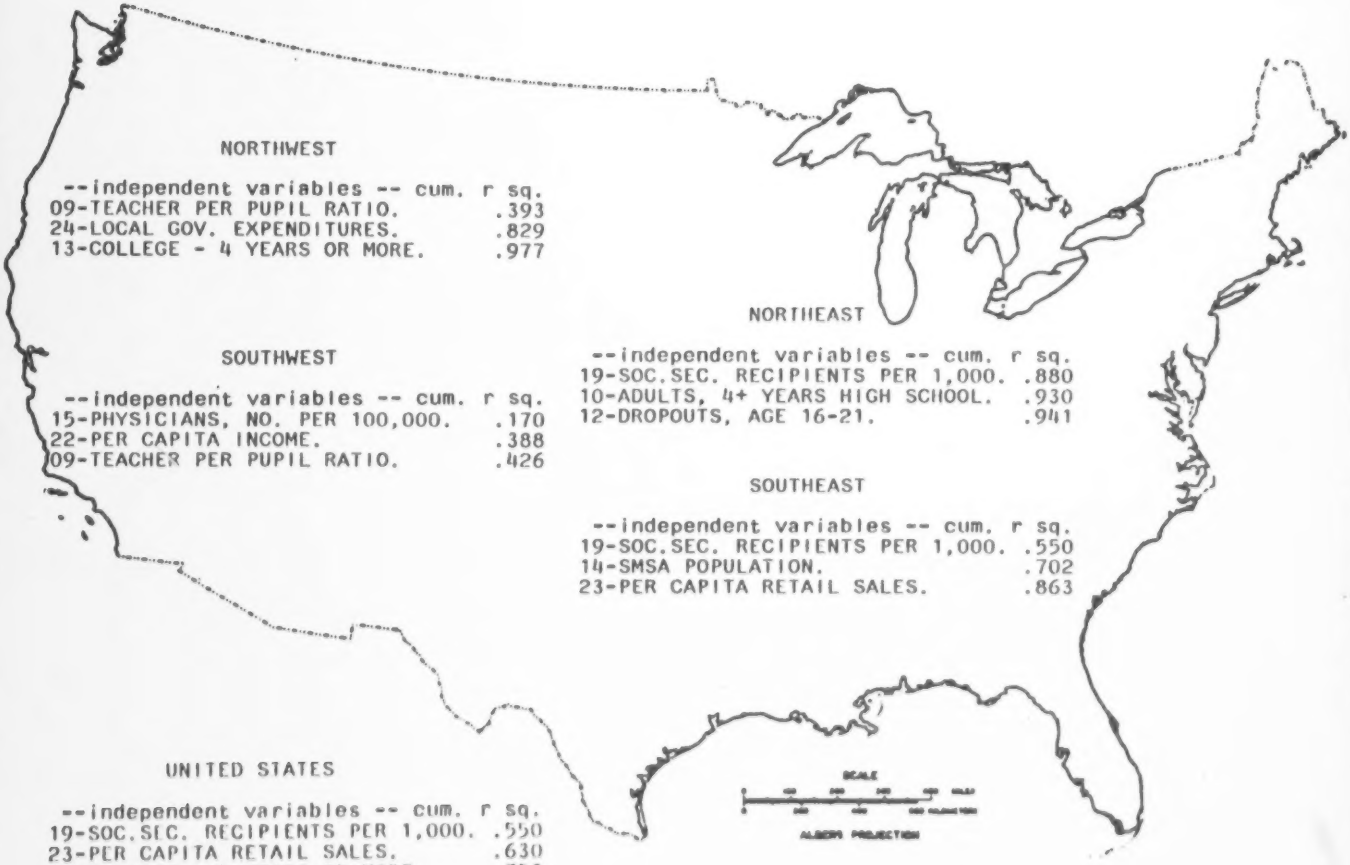

NORTHWEST
--independent variables -- cum. r sq.
17-REPUBLICAN VOTE FOR PRES. .728
15-PHYSICIANS, NO. PER 100,000. .802
24-LOCAL GOV. EXPENDITURES. .929
NORTHEAST
--independent variables -- cum. r sq.
19-SOC.SEC. RECIPIENTS PER 1,000. .617
13-COLLEGE - 4 YEARS OR MORE. .750
22-PER CAPITA INCOME. .876
SOUTHWEST
--independent variables -- cum. r sq.
13-COLLEGE - 4 YEARS OR MORE. .451
23-PER CAPITA RETAIL SALES. .640
21-INCOME PER SQ. MILE. .701
SOUTHEAST
--independent variables -- cum. r sq.
10-ADULTS, 4+ YEARS HIGH SCHOOL. .581
23-PER CAPITA RETAIL SALES. .736
19-SOC.SEC. RECIPIENTS PER 1,000. .885
UNITED STATES
--independent variables -- cum. r sq.
19-SOC.SEC. RECIPIENTS PER 1,000. .257
13-COLLEGE - 4 YEARS OR MORE. .472
23-PER CAPITA RETAIL SALES. .614

Figure 5

STEPWISE REGRESSION - PUBLIC LIBRARY VOLUMES PER THOUSAND - VARIABLE 6



NORTHWEST

--independent variables --	cum. r sq.
09-TEACHER PER PUPIL RATIO.	.393
24-LOCAL GOV. EXPENDITURES.	.829
13-COLLEGE - 4 YEARS OR MORE.	.977

NORTHEAST

--independent variables --	cum. r sq.
19-SOC.SEC. RECIPIENTS PER 1,000.	.880
10-ADULTS, 4+ YEARS HIGH SCHOOL.	.930
12-DROPOUTS, AGE 16-21.	.941

SOUTHWEST

--independent variables --	cum. r sq.
15-PHYSICIANS, NO. PER 100,000.	.170
22-PER CAPITA INCOME.	.388
09-TEACHER PER PUPIL RATIO.	.426

SOUTHEAST

--independent variables --	cum. r sq.
19-SOC.SEC. RECIPIENTS PER 1,000.	.550
14-SMSA POPULATION.	.702
23-PER CAPITA RETAIL SALES.	.863

UNITED STATES

--independent variables --	cum. r sq.
19-SOC.SEC. RECIPIENTS PER 1,000.	.550
23-PER CAPITA RETAIL SALES.	.630
13-COLLEGE - 4 YEARS OR MORE.	.753

Figure 6

total variation for these four socio-economic items is noted. Social Security recipients refers only to Social Security Recipients per 1,000 Population - variable 19 and not variable 18. The explanation for education comes from variables 13 - College Graduates, and 10 - High School Graduates. Income's influence as a predictor comes from an assortment of variables, none of which, provide the most variation in any of the geographic regions. They are Per Capita Retail Sales - variable 23; Per Capita Income - variable 22; Number of Physicians Per 100,000 Population - variable 15; Local Government Expenditures - variable 24; and Income Per Square mile - variable 21. The political orientation of a region, as noted by variable 17 - Percent Republican Vote for President, also contributes. The strong Republican vote in the Northwest region may be related to greater support for library collections because of the identification of that party with individuals with relatively higher incomes.

The predictors of Public Library Collections per 1,000 Population - variable 6, exhibit a pattern of distribution similar to that of variable 2, as noted in the preceding paragraph. However, instead of a relatively even distribution, the explanation is concentrated in one variable. The major predictor is Social Security recipients, as exhibited by variable 19 - Social Security Recipients per 1,000. Income contributes an additional amount of variation, or R^2,

to that provided by Social Security recipients. Education's additional input as a predictor is even less than that of income to these regional models.

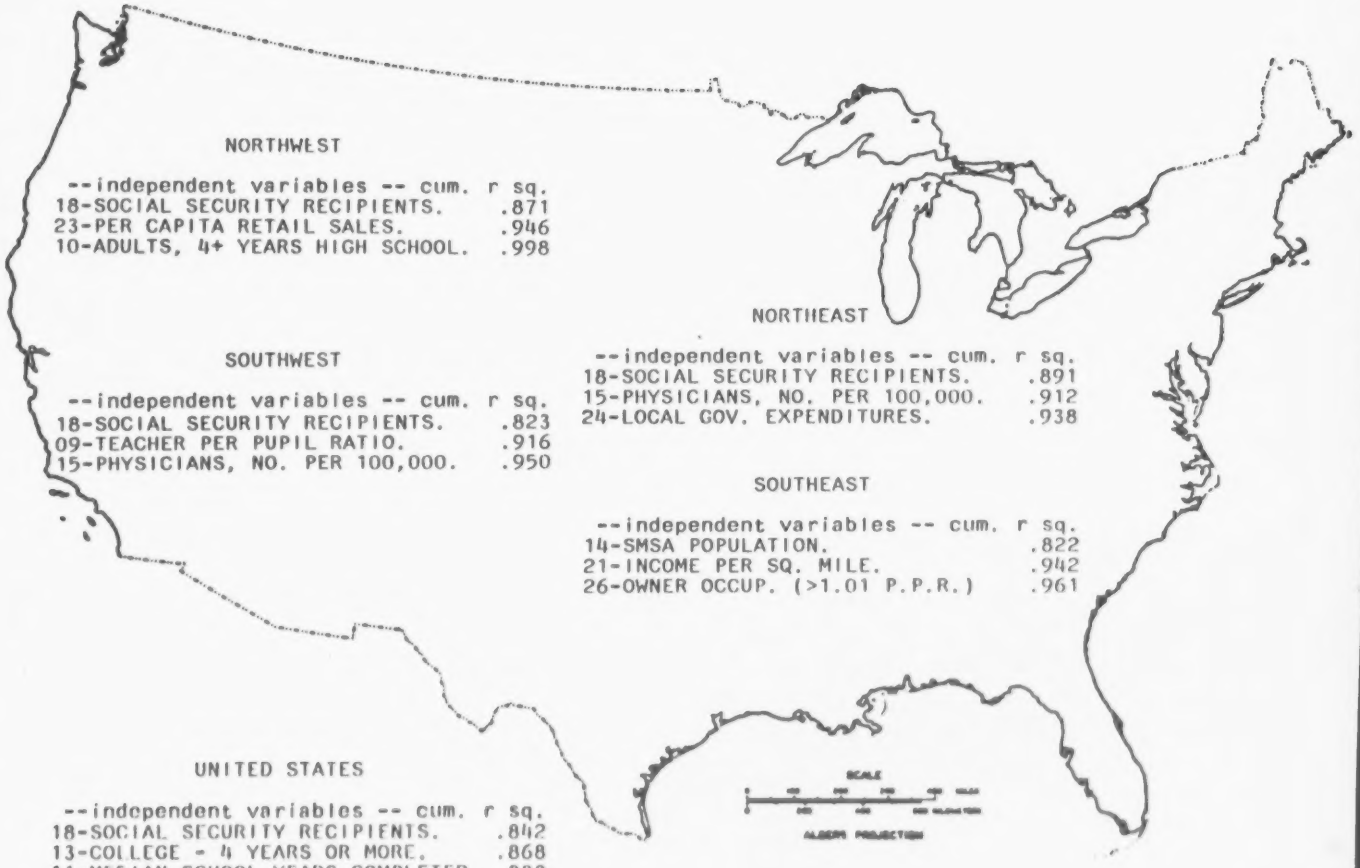
Separate mention of the Southwest region must be made. The total explanation of variation for variable 6 concerning Public Library Collections per 1,000, as given by the three listed variables, is much less than that noted by the other three small geographic regions. in fact, seven different independent variable predictors contribute significantly to its variation. (See Appendix C for details.)

In support of the first hypothesis, the strength or high value for R^2 in each geographic region for both library collection variables is noted. Public library collection size has the greater total explanation of variation in all geographic regions except the Southeast. Based on R^2 or percent of total variation, when academic and public library collection size are compared, the second hypothesis is not upheld for these two library variables.

Library Numbers

This section evaluates the data relating to numbers of institutions as presented in Figures 7 and 8. From Figure 7, the statistics relating to Academic Library Numbers - variable 3, reveal that the predictor providing the largest amount of explanation is size, representing variable 14 -

STEPWISE REGRESSION - ACADEMIC LIBRARY NUMBERS - VARIABLE 3



NORTHWEST

--independent variables --	cum. r sq.
18-SOCIAL SECURITY RECIPIENTS.	.871
23-PER CAPITA RETAIL SALES.	.946
10-ADULTS, 4+ YEARS HIGH SCHOOL.	.998

NORTHEAST

--independent variables --	cum. r sq.
18-SOCIAL SECURITY RECIPIENTS.	.891
15-PHYSICIANS, NO. PER 100,000.	.912
24-LOCAL GOV. EXPENDITURES.	.938

SOUTHWEST

--independent variables --	cum. r sq.
18-SOCIAL SECURITY RECIPIENTS.	.823
09-TEACHER PER PUPIL RATIO.	.916
15-PHYSICIANS, NO. PER 100,000.	.950

SOUTHEAST

--independent variables --	cum. r sq.
14-SMSA POPULATION.	.822
21-INCOME PER SQ. MILE.	.942
26-OWNER OCCUP. (>1.01 P.P.R.)	.961

UNITED STATES

--independent variables --	cum. r sq.
18-SOCIAL SECURITY RECIPIENTS.	.842
13-COLLEGE - 4 YEARS OR MORE.	.868
11-MEDIAN SCHOOL YEARS COMPLETED.	.888

Figure 7

STEPWISE REGRESSION - PUBLIC LIBRARY NUMBERS - VARIABLE 7

NORTHWEST
--independent variables -- cum. r sq.
21-INCOME PER SQ. MILE. .649
09-TEACHER PER PUPIL RATIO. .805
12-DROPOUTS, AGE 16-21. 1.000
NORTHEAST
--independent variables -- cum. r sq.
18-SOCIAL SECURITY RECIPIENTS. .901
13-COLLEGE - 4 YEARS OR MORE. .956
26-OWNER OCCUP. (>1.01 P.P.R.) .967
SOUTHWEST
--independent variables -- cum. r sq.
18-SOCIAL SECURITY RECIPIENTS. .903
24-LOCAL GOV. EXPENDITURES. .954
09-TEACHER PER PUPIL RATIO. .967
SOUTHEAST
--independent variables -- cum. r sq.
14-SMSA POPULATION. .823
16-CRIME RATE. .950
12-DROPOUTS, AGE 16-21. .974
UNITED STATES
--independent variables -- cum. r sq.
14-SMSA POPULATION. .857
12-DROPOUTS, AGE 16-21. .893
16-CRIME RATE. .907

Figure 8

SMSA Population, and variable 18 - Social Security Recipients. It supplies over eighty percent of the variation in all five geographic regions. Other socio-economic variables provide limited additional contributions to the explanation of variation for these regional models.

The predictors for Public Library Numbers - variable 7, from Figure 8 include many of the same variables. Size, representing variable 14 - SMSA Population, and variable 18 - Social Security Recipients, is the strongest predictor of variation in all five geographic regions for this dependent variable. They provide over 80% of the variation in all five geographic regions. Therefore, size seems to be the most important factor in determining the number of both academic and public libraries.

Other socio-economic predictors make limited additions to the variation. Important predictors for explanation of variation for Academic Library Numbers come from a total of five socio-economic variables while those for Public Library Numbers are from eight of these independent variables.

If the two hypotheses are evaluated in terms of library numbers, some interesting observations are possible. For the first hypothesis, the strength or high percentage of explanation of variation given by R^2 for both dependent variables is noted, with the values being nearly equal in three of the the five geographic regions. For the other two

regions the value of R^2 is higher for academic library numbers in one and for public library numbers in the other. Based on percent of total explanation, when academic and public library numbers are noted, the second hypothesis is not upheld, since the comparison of the R^2 values reveals little difference.

Library Numbers per 1,000,000 Population

This section evaluates the data presented in Figures 9 and 10. Variable 4 - Academic Library Numbers per 1,000,000 Population, Figure 9, presents a more scattered distribution of the total explanation of variation provided by the independent variables when compared with that of variable 3 - Academic Library Numbers, Figure 7. A similar observation was noted in the previous discussion of library variables 2 and 6 concerning library volumes per 1,000 population. Three different predictors supply the largest amount of explanation of variation among the five geographic regions. Geographic area (SMSA size) represented by variable 20 - Land Area in Square Miles, provides the largest variation with variable 19 - Social Security Recipients per 1,000 Population, almost as large. Income is another significant predictor. Education variables contribute much less to the total explanation of variation for the models of each geographic region.

STEPWISE REGRESSION - ACADEMIC LIBRARY NUMBERS PER MILLION - VARIABLE 4

NORTHWEST
--independent variables -- cum. r sq.
20-LAND AREA IN SQ. MILES. .705
24-LOCAL GOV. EXPENDITURES. .969
15-PHYSICIANS, NO. PER 100,000. .993
NORTHEAST
--independent variables -- cum. r sq.
19-SOC.SEC. RECIPIENTS PER 1,000. .838
12-DROPOUTS, AGE 16-21. .867
22-PER CAPITA INCOME. .883
SOUTHWEST
--independent variables -- cum. r sq.
23-PER CAPITA RETAIL SALES. .254
15-PHYSICIANS, NO. PER 100,000. .383
20-LAND AREA IN SQ. MILES. .610
SOUTHEAST
--independent variables -- cum. r sq.
20-LAND AREA IN SQ. MILES. .535
11-MEDIAN SCHOOL YEARS COMPLETED. .707
12-DROPOUTS, AGE 16-21. .797
UNITED STATES
--independent variables -- cum. r sq.
19-SOC.SEC. RECIPIENTS PER 1,000. .550
16-CRIME RATE. .610
13-COLLEGE - 4 YEARS OR MORE. .651
SCALE
ALBERS PROJECTION

Figure 9

STEPWISE REGRESSION - PUBLIC LIBRARY NUMBERS PER MILLION - VARIABLE 8

Figure 10

The predictors for Public Library Numbers per 1,000,000 Population - variable 8 (Figure 10), exhibit the broad-based pattern of explanation similar to that noted with variable 4, Academic Libraries per Million. Listed in order of total amounts of variation are the following predictors: Social Security recipients, crime, income, and education. Social Security recipients represented by variable 19 - Social Security Recipients per 1,000, is the largest source in two of the three regions in which it appears. Next in amount of total variation is crime, variable 16 - Crime Rate, with variable 24 - Local Government Expenditures, providing almost the same amount. The additional amount of explanation of variation given by education variables is somewhat less.

Special mention of the Southwest region is again useful. Significant amounts of variation are provided by at least five different socio-economic variables for library variables 4 and 8, Academic and Public Libraries per Million. This region provides another example of an exception to the usual pattern where all amounts of variation of over five percent are concentrated in three or fewer variables.

If the hypotheses are again evaluated in terms of library numbers, a different pattern is observed. In support of the first hypothesis as restated earlier in the section entitled Library Numbers, the large amounts of explanation of

variation given by R^2 for both library variables is noted. From Appendix B, the Southwest region's model has a total explanation of variation for academic libraries of over 89%, with the total explanation for public libraries at over 94%. Then, public library numbers has the greater total explanation in only three of the five geographic regions. Based on percent of total explanation of variation, when academic and public library numbers are noted, the second hypothesis is not upheld for these two library variables.

SUMMARY

The most significant observation of the data presented in this chapter is to note the high amount of total explanation of variation for the library variables in terms of R^2. For most regions the total explanation is above .80 or 80%. The choice of independent variables or predictors was probably significant, along with the concentration of explanation of variation in a limited number of predictors in most geographic regions. Also, the small number of data points, or SMSAs, in the region may contribute. The tendency is for this prediction of variation to decrease as the number of data points in the regions increase. This suggests the possibility that curvilinear models may become better sources of explanation of variation as the number of data points increase.

Library Collection Size

The first hypothesis may be evaluated in this chapter from the comparison of the models for Academic and Public Library collection Size presented in Figures 3 and 4 respectively; and the models for Academic and Public Library Collections per 1,000 population presented in Figures 5 and 6 respectively. The high percentage of R^2 or total explanation contributed by the selected socio-economic variables provides ample support for this hypothesis. Therefore, it is upheld. The second hypothesis may also be evaluated from the same models. Based on the percent of explanation for library volumes, this hypothesis seems to be disproved. This occurred since the amount of total explanation of variation observed is greater for public library volume models than for academic library volume models.

Numbers of Libraries

In this section the hypotheses are restated to provide comparison of models for Academic and Public Library Numbers presented in Figures 7 and 8 respectively; and the models for Academic and Public Libraries per Million population presented in Figures 9 and 10 respectively. Restating the first hypothesis in terms of library numbers it now reads; The socio-economic character of the population in the selected SMSAs will relate to the numbers of both academic

libraries and public libraries. The high percentage of R^2 or total explanation of variation contributed by the selected socio-economic variables provides ample support for this hypothesis. Therefore, it is upheld. Restating the second hypothesis in terms of library numbers: Academic library numbers reveal greater correspondence with these population characteristics than public library collection size. Based on the percent of explanation of variation for library volumes, this hypothesis is disproved. This occurred since the amount of total explanation of variation observed is greater for public library number models than for academic library number models with library numbers per million population, but nearly equal with library numbers.

Chapter V

SUMMARY AND CONCLUSIONS

REGIONAL SUMMARY

The presentation of library data on a regional basis, for the United States, has served to highlight regional variations that would not be available if only the statistical results for the fifty SMSAs were presented.

The Northeast is a mature region in which little growth in population size is taking place in its SMSAs. The Northwest is a region in which SMSA population is limited by its geographic features, such as, terrain, climate, and altitude. Mineral wealth, agriculture, transportation nodes, and regional business activities have played important roles in the growth of SMSAs in the Northwest.

Both the Southeast and the Southwest regions are part of the Sunbelt. Microclimate modification (air conditioning) at the level of the individual household and a lower salary scale have fostered their growth in population with the former and economic development with the latter.

The Southeast's development experienced a major setback with the advent of the Civil War. Its culture and economic

development were probably major factors in the slow growth of library collections. In addition, the development of academic library collections was hindered because the planter class was opposed to the concept of state-supported higher education. Instead, they placed this responsibility on the religious bodies of the region (Hamlin, 1981).

For the Southwest, a major impact on the size of its SMSAs is its physical location adjacent to a country with a much lower standard of living and few economic opportunities. Major SMSAs throughout the region have experienced population growth because of immigration from Mexico and other Latin American countries.

SUMMARY AND CONCLUSIONS

The relationships between two sets of variables, library and socio-economic, were selected for this study. Data were obtained for the fifty largest SMSAs in the United States as of April 15, 1973. Two hypotheses were formulated to assist in this evaluation. The first hypothesis notes that the socio-economic character in the selected SMSAs relates to the collection size of both academic libraries and public libraries. The second hypothesis is that academic library collection size exhibits greater correspondence with these socio-economic characteristics than public library collection size. Frequency distribution, correlation analysis,

and regression analysis were the statistical methods used to aid in these evaluations.

In Chapter One the reasons for selecting the SMSA as the unit of study were mentioned, especially, the availability of data for the socio-economic variables. The *American Library Directory* (1975) and the methods used to obtain the library variable data from it were introduced.

In the second chapter, the four regions used for comparative analysis were defined. Regional differences were highlighted in discussing the means by variable group: library variables in two segments, academic and public; and socio-economic variables in three segments, education, general characteristics, and income and housing. In discussing the frequency distribution of all data sets a pattern emerged for establishing a comparison between the four regions of the United States. This pattern, in making comparisons with the United States' mean, noted that the mean for the Northeast was always above the average (highest), the Southeast's mean almost always the lowest, with the means for the two western regions somewhere in-between.

For Chapter Three, the similarity between the United States and the Northeast in terms of numbers and occurrence of significant correlations is observed. The first hypothesis is supported only for the United States. The second hypothesis may not be supported since the number of

significant correlations with academic library collection variables and public library collection variables are nearly the same.

In the last chapter the high amount of total explanation of variation or total sum for R^2, for all pairs of variables, lends support to the first hypothesis. The major factor was the presence of size (population size) and/or one of its surrogates as independent variables or predictors. However, the second hypothesis is refuted because the models providing a greater amount of explanation of variation are greater for public library collections than academic library collections. The major reason appears to be the greater contribution of "size" or population based predictors to the value of R^2 for public libraries. The same situation, first hypothesis upheld and second rejected, was found when the hypotheses were evaluated in terms of the dependent variables related to the number of libraries.

The failure of the second hypothesis suggests that the public library model is more strongly influenced by population size.

DIRECTIONS FOR FUTURE RESEARCH

Other socio-economic variables could be used or added to those included in this study, especially those relating to various segments of the population. For better comparison and interpretation of regional results the random selection of twenty SMSAs from each region is suggested.

As constructed, the data for library variables 3 and 4, Academic Library Numbers and Academic Library Numbers per 1,000 Population, respectively, may also be evaluated in terms of numbers of two and four year colleges present in the SMSAs being evaluated. Additional hypotheses concerning Public Library Numbers, variable 7, and/or Public Library Numbers per 1,000 Population, variable 8, or any of the other library variables could be made and evaluated utilizing the data resulting from this research. In addition, the data for individual SMSAs could be compared with regional and/or national data for library collections.

This study provides a framework around which other statistical data could be evaluated. Almost any socio-economic data could be utilized as long as the SMSA or urbanized area is the regional unit selected for analysis.

Appendix A

SMSA LISTINGS

THE 50 LARGEST SMSAS RANKED BY POPULATION - 1973

1 New York, N. Y.-N. J.
2 Chicago, Ill.
3 Los Angeles-Long Beach, Calif.
4 Philadelphia, Pa.-N. J.
5 Detroit, Mich.
6 San Francisco-Oakland, Calif.
7 Washington, D. C.-Md.-Va.
8 Boston, Mass.
9 Nassau-Suffolk, N. Y.
10 Dallas-Ft. Worth, Tex.
11 St. Louis, Mo.-Ill.
12 Pittsburgh, Pa.
13 Houston, Tex.
14 Baltimore, Md.
15 Newark, N. J.
16 Cleveland, Ohio.
17 Minneapolis-St. Paul, Minn.-Wis.
18 Atlanta, Ga.
19 Anaheim-Santa Ana-Garden Grove, Calif.
20 San Diego, Calif.
21 Milwaukee, Wis.
22 Seattle-Everett, Wash.
23 Cincinnati, Ohio-Ky.-Ind.
24 Denver-Boulder, Colo.
25 Miami, Fla.
26 Buffalo, N. Y.
27 Kansas City, Mo.-Kans.
28 Tampa-St. Petersburg, Fla.
29 Riverside-San Bernardino-Ontario, Calif.
30 San Jose, Calif.
31 Indianapolis, Ind.
32 Phoenix, Ariz.
33 New Orleans, La.
34 Portland, Oreg.-Wash.
35 Columbus, Ohio.
36 Rochester, N. Y.
37 San Antonio, Tex.
38 Providence-Warwick-Pawtucket, R. I.-Mass.
39 Louisville, Ky.-Ind.
40 Sacramento, Calif.
41 Memphis, Tenn.-Ark.-Miss.
42 Dayton, Ohio.
43 Albany-Schenectady-Troy, N. Y.
44 Birmingham, Ala.
45 Toledo, Ohio-Mich.
46 Greensboro - Winston-Salem - High Point, N. Car.
47 Fort Lauterdale-Hollywood, Fla.
48 Salt Lake City-Ogden, Utah.
49 Oklahoma City, Okla.
50 Norfolk-Virginia Beach-Portsmouth, Va.-N. Car.

THE 50 LARGEST SMSAS IN ALPHABETICAL ORDER - 1973

43	Albany-Schenectady-Troy, N. Y.
19	Anaheim-Santa Ana-Garden Grove, Calif.
18	Atlanta, Ga.
14	Baltimore, Md.
44	Birmingham, Ala.
8	Boston, Mass.
26	Buffalo, N. Y.
2	Chicago, Ill.
23	Cincinnati, Ohio-Ky.-Ind.
16	Cleveland, Ohio.
35	Columbus, Ohio.
10	Dallas-Ft. Worth, Tex.
42	Dayton, Ohio.
24	Denver-Boulder, Colo.
5	Detroit, Mich.
47	Fort Lauterdale-Hollywood, Fla.
46	Greensboro - Winston-Salem - High Point, N. Car.
13	Houston, Tex.
31	Indianapolis, Ind.
27	Kansas City, Mo.-Kans.
3	Los Angeles-Long Beach, Calif.
39	Louisville, Ky.-Ind.
41	Memphis, Tenn.-Ark.-Miss.
25	Miami, Fla.
21	Milwaukee, Wis.
17	Minneapolis-St. Paul, Minn.-Wis.
9	Nassau-Suffolk, N. Y.
33	New Orleans, La.
1	New York, N. Y.-N. J.
15	Newark, N. J.
50	Norfolk-Virginia Beach-Portsmouth, Va.-N. Car.
49	Oklahoma City, Okla.
4	Philadelphia, Pa.-N. J.
32	Phoenix, Ariz.
12	Pittsburgh, Pa.
34	Portland, Oreg.-Wash.
38	Providence-Warwick-Pawtucket, R. I.-Mass.
29	Riverside-San Bernardino-Ontario, Calif.
36	Rochester, N. Y.
40	Sacramento, Calif.
11	St. Louis, Mo.-Ill.
48	Salt Lake City-Ogden, Utah.
37	San Antonio, Tex.
20	San Diego, Calif.
6	San Francisco-Oakland, Calif.
30	San Jose, Calif.
22	Seattle-Everett, Wash.
28	Tampa-St. Petersburg, Fla.
45	Toledo, Ohio-Mich.
7	Washington, D. C.-Md.-Va.

Appendix B

FREQUENCY DISTRIBUTION

VARIABLE 01 - Academic library vols.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	3,421,600	3,436,100	2,295,000
NE	4,567,100	4,702,600	2,654,000
NW	2,293,100	894,800	2,293,000
SE	2,060,600	1,845,300	1,608,000
SW	3,506,800	2,714,800	2,341,000

VARIABLE 02 _ Academic lib., vols. per 1,000.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	1,889.9	1,267.9	1,622.4
NE	2,220.4	1,751.8	1,695.6
NW	1,888.8	660.0	1,717.3
SE	1,445.4	786.6	1,264.1
SW	1,783.5	928.3	1,431.1

VARIABLE 03 - Academic library nos.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	18.9	15.5	14.2
NE	23.6	21.6	14.0
NW	14.1	6.8	13.3
SE	13.5	8.7	10.3
SW	19.2	10.6	17.8

VARIABLE 04 - Academic libs. per 1,000.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	10.8	5.4	9.4
NE	11.4	7.8	8.6
NW	11.0	3.2	11.3
SE	10.2	3.9	9.9
SW	10.5	2.8	10.2

VARIABLE 05 - Public library vols.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	3,860,700	3,587,100	2,513,500
NE	5,614,300	4,549,000	3,781,000
NW	2,431,300	1,154,500	2,344,000
SE	1,938,300	1,805,200	1,250,000
SW	3,694,100	2,939,600	2,465,000

VARIABLE 06 - Public library, vols. per 1,000.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	2,172.0	1,587.2	1,962.8
NE	2,933.3	2,280.0	2,449.5
NW	1,880.0	423.0	1,835.6
SE	1,334.3	460.7	1,310.4
SW	1,925.4	739.5	1,961.1

VARIABLE 07 - Public library nos.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	77.5	63.2	57.5
NE	108.9	76.5	80.0
NW	51.6	25.5	52.0
SE	42.5	26.1	31.0
SW	75.2	59.6	57.0

VARIABLE 08 - Public libs. per 1,000.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	44.6	25.8	37.5
NE	57.8	35.4	51.0
NW	39.6	11.5	37.2
SE	32.8	11.0	34.3
SW	37.9	14.7	33.7

VARIABLE 09 - Teacher per pupil ratio.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	18.3	1.6	18.5
NE	17.4	1.6	17.6
NW	18.8	1.5	18.6
SE	18.6	1.6	18.5
SW	19.0	1.4	19.5

VARIABLE 10 - Adults, 4+ years high school.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	55.4%	7.7	54.7%
NE	54.3%	4.6	54.6%
NW	61.9%	7.1	62.9%
SE	47.8%	4.1	46.9%
SW	59.9%	8.2	62.0%

VARIABLE 11 - Median school years completed.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	12.11	0.36	12.17
NE	12.11	0.20	12.14
NW	12.31	0.29	12.40
SE	11.83	0.44	11.90
SW	12.23	0.38	12.36

VARIABLE 12 - Dropouts, age 16-21.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	13.9%	3.7	14.1%
NE	12.8%	3.2	12.4%
NW	11.8%	1.9	11.6%
SE	17.1%	1.8	17.6%
SW	14.1%	4.6	14.8%

VARIABLE 13 - College, 4 years or more.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	12.4%	3.0	11.7%
NE	11.6%	2.1	11.0%
NW	13.7%	2.5	13.6%
SE	11.4%	4.3	9.7%
SW	13.6%	2.7	13.3%

VARIABLE 14 - SMSA population.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	1,942,500	1,802,300	1,299,500
NE	2,506,300	2,435,500	1,417,000
NW	1,287,900	556,800	1,299,000
SE	1,303,300	733,100	886,000
SW	2,011,800	1,621,900	1,470,000

VARIABLE 15 - Physicians, no. per 100,000.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	199.4	42.0	196.0
NE	197.9	45.5	197.0
NW	201.6	30.4	195.9
SE	194.8	50.9	188.6
SW	204.2	37.6	201.8

VARIABLE 16 - Crime rate.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	5,920.8	1,453.3	5,898.0
NE	4,848.2	1,156.3	4,693.0
NW	6,575.3	622.6	6,423.0
SE	6,407.3	1,607.2	5,940.0
SW	6,641.9	1,204.7	6,645.0

VARIABLE 17 - Republican vote for Pres., 1972.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	60.1%	7.5	60.7%
NE	57.3%	6.8	55.5%
NW	60.8%	7.7	61.1%
SE	65.4%	6.2	66.3%
SW	59.2%	7.8	60.9%

VARIABLE 18 - Social Security recipients.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	258.1	244.3	187.0
NE	346.6	334.0	196.0
NW	164.0	86.0	157.0
SE	176.6	80.0	186.3
SW	248.3	208.7	194.0

VARIABLE 19 - Social Security recipients per 1,000.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	141.4	67.2	130.2
NE	156.4	97.9	135.1
NW	124.6	18.5	126.3
SE	146.8	56.4	134.3
SW	123.8	19.4	122.7

VARIABLE 20 - Land area in sq. miles.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	3,566.5	3,915.6	2,624.5
NE	2,215.5	953.8	2,149.0
NW	4,694.1	1,808.8	4,226.0
SE	2,391.2	963.4	2,259.0
SW	5,928.4	6,920.3	4,069.0

VARIABLE 21 - Income per sq. mile.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	3,746.5	4,952.2	1,918.0
NE	6,007.8	7,089.0	4,114.0
NW	1,234.9	530.4	1,315.0
SE	2,448.7	1,437.4	2,361.0
SW	2,892.1	2,963.7	1,390.0

VARIABLE 22 - Per capita income.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	5,336.6	573.8	5,282.5
NE	5,574.5	525.8	5,450.0
NW	5,178.4	472.6	5,364.0
SE	5,169.9	607.5	5,099.0
SW	5,215.2	604.1	5,157.0

VARIABLE 23 - Per capita retail sales.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	2,355.4	224.7	2,312.5
NE	2,251.3	149.6	2,210.0
NW	2,410.3	162.1	2,425.0
SE	2,469.3	340.9	2,298.0
SW	2,381.6	176.3	2,439.0

VARIABLE 24 - Local gov. expenditures.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	560.8	167.0	534.5
NE	599.0	200.7	534.0
NW	479.1	97.7	520.0
SE	503.4	129.7	498.0
SW	597.7	154.9	607.0

VARIABLE 25 - Owned housing units.

REGION	MEAN	STD. DEVIATION	MEDIAN
US	62.0%	8.2	63.0%
NE	62.2%	10.3	62.9%
NW	65.5%	2.2	65.0%
SE	61.8%	8.7	59.1%
SW	59.9%	6.0	61.7%

VARIABLE 26 - Owner occup. (>1.01 persons per rm.)

REGION	MEAN	STD. DEVIATION	MEDIAN
US	7.5%	2.5	6.9%
NE	6.5%	1.4	6.1%
NW	6.7%	2.3	6.2%
SE	8.4%	3.0	8.1%
SW	8.8%	2.7	8.5%

Appendix C

REGRESSION TABLES

UNITED STATES - STEPWISE REGRESSION

(Academic library volumes) - 01

--Independent Variables--	BETA	Cum. R^2
14 - SMSA population.	-.10	.673
15 - Physicians, no. per 100,000.	.20	.744
16 - Crime rate.	-.16	.767
17 - Percent Repub. vote for Pres., 1972.	-.17	.781
22 - Per capita income.	-.16	.797
13 - College - 4 years or more.	.38	.828
18 - Social Security recipients.	.96	.840
24 - Local gov. expenditures.	-.21	.860

(Academic library vol. per 1,000) - 02

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	.64	.257
13 - College - 4 years or more.	.60	.472
23 - Per capita retail sales.	-.05	.614
22 - Per capita income.	.40	.649
16 - Crime rate.	-.31	.668
17 - Percent Repub. vote for Pres., 1972.	-.20	.698
15 - Physicians, no. per 100,000.	.16	.713

(Academic library numbers) - 03

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	.90	.842
13 - College - 4 years or more.	.28	.868
11 - Median school years completed.	-.22	.888
17 - Percent Repub. vote for Pres., 1972.	-.12	.898

(Academic libraries per 1,000,000) - 04

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	.82	.550
16 - Crime rate.	-.15	.610
13 - College - 4 years or more.	.48	.651
22 - Per capita income.	-.22	.704
11 - Median school years completed.	-.38	.736
12 - Dropouts, age 16-21.	-.19	.752

(Public library volumes) - 05

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	.84	.816
13 - College - 4 years or more.	.17	.854
23 - Per capita retail sales.	-.10	.878
15 - Physicians, no. per 100,000.	.15	.888
16 - Crime rate.	-.13	.898

(Public library vol. per 1,000) - 06

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	.89	.550
23 - Per capita retail sales.	-.37	.630
13 - College - 4 years or more.	.39	.753
09 - Teacher per pupil ratio.	.20	.765
16 - Crime rate.	-.15	.779
22 - Per capita income.	.12	.788

(Public library numbers) - 07

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	.88	.857
12 - Dropouts, age 16-21.	-.12	.893
16 - Crime rate.	-.17	.907
26 - Owner occup. (>1.01 p.p.r.)	.15	.923

(Public libraries per 1,000,000) - 08

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	.79	.455
16 - Crime rate.	-.29	.614
10 - Adults, 4+ years high school.	.22	.685
23 - Per capita retail sales.	-.25	.708
13 - College - 4 years or more.	.01	.728
18 - Social Security recipients.	-1.00	.742
24 - Local gov. expenditures.	.24	.770
14 - SMSA population.	.78	.781

NORTHEAST - STEPWISE REGRESSION

(Academic library volumes) - 01

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	-1.43	.662
15 - Physicians, no. per 100,000.	.70	.774
24 - Local gov. expenditures.	-.26	.867
12 - Dropouts, age 16-21.	.38	.905
16 - Crime rate.	.28	.921
22 - Per capita income.	-.34	.929
14 - SMSA population.	2.17	.948
19 - Soc. Sec. recipients per 1,000.	.16	.960

(Academic library vol. per 1,000) - 02

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	.80	.617
13 - College - 4 years or more.	.68	.750
22 - Per capita income.	-.56	.876
17 - Percent Repub. vote for Pres., 1972.	-.37	.928
20 - Land area in sq. miles.	.05	.949
23 - Per capita retail sales.	.34	.957
10 - Adults, 4+ years high school.	-.32	.975

(Academic library numbers) - 03

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	.85	.891
15 - Physicians, no. per 100,000.	.09	.912
24 - Local gov. expenditures.	-.36	.938
09 - Teacher per pupil ratio.	-.34	.954
17 - Percent Repub. vote for Pres., 1972.	-.10	.962

(Academic libraries per 1,000,000) - 04

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	.79	.838
12 - Dropouts, age 16-21.	-.24	.867
22 - Per capita income.	-.29	.883
09 - Teacher per pupil ratio.	-.24	.905
16 - Crime rate.	.30	.924
21 - Income per sq. mile.	-.28	.945

(Public library volumes) - 05

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	.91	.829
15 - Physicians, no. per 100,000.	.41	.912
10 - Adults, 4+ years high school.	.17	.942
09 - Teacher per pupil ratio.	.29	.954
20 - Land area in sq. miles.	-.18	.977

(Public library vol. per 1,000) - 06

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	1.06	.880
10 - Adults, 4+ years high school.	.56	.930
12 - Dropouts, age 16-21.	.14	.941
11 - Median school years completed.	-.26	.952

(Public library numbers) - 07

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	1.00	.901
13 - College - 4 years or more.	.19	.956
26 - Owner occup. (>1.01 p.p.r.)	-.13	.967

(Public libraries per 1,000,000) - 08

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	.75	.760
26 - Owner occup. (>1.01 p.p.r.)	-.15	.838
14 - SMSA population.	-.41	.857
09 - Teacher per pupil ratio.	-.31	.898
16 - Crime rate.	.12	.907

NORTHWEST - STEPWISE REGRESSION

(Academic library volumes) - 01

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	1.82	.618
17 - Percent Repub. vote for Pres., 1972.	1.43	.815
12 - Dropouts, age 16-21.	-0.35	.930
16 - Crime rate.	0.96	.974
25 - Owned housing units.	0.47	1.000

(Academic library vol. per 1,000) - 02

--Independent Variable--	BETA	Cum. R^2
17 - Percent Repub. vote for Pres., 1972.	1.04	.728
15 - Physicians, no. per 100,000.	1.21	.802
24 - Local gov. expenditures.	-0.27	.929
10 - Adults, 4+ years high school.	-0.68	.971
25 - Owned housing units.	0.39	.998

(Academic library numbers) - 03

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	0.87	.871
23 - Per capita retail sales.	0.40	.946
10 - Adults, 4+ years high school.	-0.37	.998

(Academic libraries per 1,000,000) - 04

--Independent Variable--	BETA	Cum. R^2
20 - Land area in sq. miles.	-1.24	.705
24 - Local gov. expenditures.	-0.76	.969
15 - Physicians, no. per 100,000.	0.21	.993

(Public library volumes) - 05

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	1.08	.839
09 - Teacher per pupil ratio.	0.46	.895
24 - Local gov. expenditures.	0.49	.977
25 - Owned housing units.	0.23	.999

(Public library vol. per 1,000) - 06

--Independent Variable--	BETA	Cum. R^2
09 - Teacher per pupil ratio.	1.50	.393
24 - Local gov. expenditures.	1.11	.829
13 - College - 4 years or more.	-0.33	.977
18 - Social Security recipients.	0.20	.996

(Public library numbers) - 07

--Independent Variable--	BETA	Cum. R^2
21 - Income per sq. mile.	1.80	.649
09 - Teacher per pupil ratio.	0.94	.805
12 - Dropouts, age 16-21.	-0.65	1.000

(Public libraries per 1,000,000) - 08

--Independent Variable--	BETA	Cum. R^2
24 - Local gov. expenditures.	1.08	.400
09 - Teacher per pupil ratio.	1.55	.850
19 - Soc. Sec. recipients per 1,000.	0.43	.969
21 - Income per sq. mile.	0.37	.980
26 - Owner occup. (>1.01 p.p.r.)	-0.32	.994

SOUTHEAST - STEPWISE REGRESSION

(Academic library volumes) - 01

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	0.94	.877
10 - Adults, 4+ years high school.	-0.32	.961
22 - Per capita income.	0.25	.972
21 - Income per sq. mile.	-0.24	.984

(Academic library vol. per 1,000) - 02

--Independent Variable--	BETA	Cum. R^2
10 - Adults, 4+ years high school.	-2.88	.581
23 - Per capita retail sales.	5.07	.736
19 - Soc. Sec. recipients per 1,000.	-2.74	.885
22 - Per capita income.	-3.22	.918
21 - Income per sq. mile.	2.21	.968
14 - SMSA population.	-0.97	.998

(Academic library numbers) - 03

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	1.44	.822
21 - Income per sq. mile.	-0.39	.942
26 - Owner occup. (>1.01 p.p.r.)	-0.05	.961
11 - Median school years completed.	-0.17	.970
17 - Percent Repub. vote for Pres., 1972.	0.21	.984

(Academic libraries per 1,000,000) - 04

--Independent Variable--	BETA	Cum. R^2
20 - Land area in sq. miles.	0.48	.535
11 - Median school years completed.	-0.65	.707
12 - Dropouts, age 16-21.	-0.69	.797
22 - Per capita income.	-0.53	.882
17 - Percent Repub. vote for Pres., 1972.	0.36	.922
24 - Local gov. expenditures.	0.41	.982

(Public library volumes) - 05

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	0.85	.912
10 - Adults, 4+ years high school.	-0.20	.956
21 - Income per sq. mile.	0.21	.968
18 - Social Security recipients.	-0.14	.977

(Public library vol. per 1,000) - 06

--Independent Variable--	BETA	Cum. R^2
19 - Soc. Sec. recipients per 1,000.	0.42	.550
14 - SMSA population.	1.51	.702
23 - Per capita retail sales.	-0.69	.863
09 - Teacher per pupil ratio.	0.48	.945
18 - Social Security recipients.	-0.53	.977
20 - Land area in sq. miles.	-0.19	.990

(Public library numbers) - 07

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	1.00	.823
16 - Crime rate.	-0.25	.950
12 - Dropouts, age 16-21.	0.21	.974
20 - Land area in sq. miles.	0.15	.990

(Public libraries per 1,000,000) - 08

--Independent Variable--	BETA	Cum. R^2
16 - Crime rate.	0.04	.799
09 - Teacher per pupil ratio.	0.59	.849
14 - SMSA population.	0.67	.871
24 - Local gov. expenditures.	-0.85	.907
19 - Soc. Sec. recipients per 1,000.	-0.67	.946
26 - Owner occup. (>1.01 p.p.r.)	-0.42	.998

SOUTHWEST - STEPWISE REGRESSION

(Academic library volumes) - 01

--Independent Variable--	BETA	Cum. R^2
14 - SMSA population.	-2.16	.728
15 - Physicians, no. per 100,000.	-0.07	.849
12 - Dropouts, age 16-21.	1.01	.885
21 - Income per sq. mile.	-0.03	.907
23 - Per capita retail sales.	-0.31	.928
18 - Social Security recipients.	3.12	.937
10 - Adults, 4+ years high school.	-0.86	.960
26 - Owner occup. (>1.01 p.p.r.)	-0.55	.988

(Academic library vol. per 1,000) - 02

--Independent Variable--	BETA	Cum. R^2
13 - College - 4 years or more.	1.45	.451
23 - Per capita retail sales.	-0.50	.640
21 - Income per sq. mile.	-0.46	.701
25 - Owned housing units.	-0.23	.777
09 - Teacher per pupil ratio.	0.34	.821
10 - Adults, 4+ years high school.	-0.25	.836

(Academic library numbers) - 03

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	0.76	.823
09 - Teacher per pupil ratio.	-0.42	.916
15 - Physicians, no. per 100,000.	0.23	.950
25 - Owned housing units.	-0.24	.967
20 - Land area in sq. miles.	0.16	.986

(Academic libraries per 1,000,000) - 04

--Independent Variable--	BETA	Cum. R^2
23 - Per capita retail sales.	-0.78	.254
15 - Physicians, no. per 100,000.	0.37	.383
20 - Land area in sq. miles.	0.77	.610
09 - Teacher per pupil ratio.	0.10	.830
14 - SMSA population.	-0.52	.898
22 - Per capita income.	1.76	.935
11 - Median school years completed.	-0.81	.962
21 - Income per sq. mile.	-0.38	.981
25 - Owned housing units.	0.28	.992

(Public library volumes) - 05

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	0.94	.921
15 - Physicians, no. per 100,000.	0.18	.954
11 - Median school years completed.	-0.47	.961
26 - Owner occup. (>1.01 p.p.r.)	-0.40	.974

(Public library vol. per 1,000) - 06

--Independent Variable--	BETA	Cum. R^2
15 - Physicians, no. per 100,000.	0.54	.170
22 - Per capita income.	1.32	.388
09 - Teacher per pupil ratio.	1.06	.426
11 - Median school years completed.	-4.10	.477
26 - Owner occup. (>1.01 p.p.r.)	-1.77	.704
25 - Owned housing units.	0.90	.814
21 - Income per sq. mile.	-0.53	.926
24 - Local gov. expenditures.	0.76	.950
23 - Per capita retail sales.	0.49	.998

(Public library numbers) - 07

--Independent Variable--	BETA	Cum. R^2
18 - Social Security recipients.	0.76	.903
24 - Local gov. expenditures.	0.24	.954
09 - Teacher per pupil ratio.	-0.21	.967
13 - College - 4 years or more.	-0.27	.976
25 - Owned housing units.	-0.17	.984
26 - Owner occup. (>1.01 p.p.r.)	-0.26	.997

(Public libraries per 1,000,000) - 08

--Independent Variable--	BETA	Cum. R^2
24 - Local gov. expenditures.	1.04	.456
13 - College - 4 years or more.	-0.81	.667
18 - Social Security recipients.	-0.61	.776
26 - Owner occup. (>1.01 p.p.r.)	-1.13	.838
10 - Adults, 4+ years high school.	-0.82	.945
25 - Owned housing units.	-0.29	.988

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